PATTERN MAKING AND GRADING
SYLLABUS

UNIT I-METHODS OF PATTERN MAKING
Methods of pattern making- Drafting-Principles of drafting. Steps in drafting children's and adults bodice and sleeve patterns. Flat pattern techniques- definition, pivot, slash and spread method.

UNIT II – COMMERCIAL PATTERN
Study of commercial patterns and body measurements. Preparation of commercial patterns. Body measurements- importance and principles of taking body measurements. Methods of taking body measurements for different garments.

UNIT III- PATTERN LAYOUT
Pattern layout- Rules in pattern layout, common methods for layout, layout for the asymmetrical designs, bold designs, checked and one-way designs. Economy of fabrics in placing the patterns- adjusting the fabrics to the patterns.

UNIT IV- FITTING AND ALTERATION
Fitting- Definition, principles of a good fit. Causes for a poor fit. Checking the fit of a garment, fitting techniques. Pattern alteration- importance of pattern alternation. Principles of pattern alternation.

UNIT V- GRADING
Grading- definition, types (manual and computerized), Manual- master grade basic back, basic front, basic collar and basic facing grading. Computerized grading technology- information flow and system description.

UNIT I

METHODS OF PATTERN MAKING:

Pattern making is an art. It is the art of manipulating and shaping a flat piece of fabric to conform to one or more curves of the human figure. Pattern making is a bridge function between design and production. A sketch can be turned into a garment via a pattern which interprets the design in the form of the garmentcomponents (Cooklin). A patternmaker typically makes a pattern from a flat sketch with measurements or a two dimensional fashion illustration. The basic pattern is the very foundation upon which pattern making, fit and design are based. The basic pattern is the starting point for flat pattern designing.

Pattern making involves three methods-

- Drafting
- Draping
- Flat paper patternmaking

DRAFTING:

It involves measurements derived from sizing systems or accurate measurements taken on a person, dress or body form.

DRAPING:

It involves the draping of a two dimensional piece of fabric around a form, conforming to its shape, creating a three-dimensional fabric pattern. This muslin is transferred to paper to be used as a final pattern .

FLAT PAPER PATTERN:

It involves the development of a fitted basic pattern with comfort ease to fit a person or body form. A sloper is the starting point for flat pattern designing. It is a simple pattern that fits the body with just enough ease for movement and comfort

DRAFTING:

- Pattern Drafting is an important part of fashion designing and requires tremendous skills and practice.
- Pattern drafting is where pattern pieces are drawn on paper according to body measurement which becomes the base for designers to create garments.
- In this method, the drafting is done directly on the final fabric of which the actual garment is going to be made.
- Drafting can be done on ordinary brown paper which should not however be too thin. To obtain an accurate draft, use a sharp pencil, and a ruler for drawing straight lines.
- To get the corners at right angles, keep an L scale or set squares ready.
- Before drafting, it is important to understand the procedures and instructions clearly, and have to practice in drawing a wellbalanced pattern with smooth curves and straight lines, you must understand the following principles before starting to attempt the drafting process.

PRINCIPLES OF DRAFTING:

1. Patterns must be made larger than the body measurements to allow for freedom of movement, ease of action and comfort in wearing. Recommended ease allowance for various parts of the body are listed below. Bust 3” to 5” (3” for tight fitting garment and 5” for loose fitting garment); waist ¼” to ½”; hip 3” to 5”; upper arm 3” to 4”; armhole depth 1”; bodice length nil; sleeve length nil; skirt length nil.

2. For symmetric designs where the right and left sides are alike, paper pattern for half front and half back only need to be made; for the bodice, start the drafting with the back part, for sleeves, full pattern must be drafted.
3. It is better to draft the primary or basic pattern blocks- plain bodice, sleeve, plain skirt without seam allowances. When this is done, be sure to leave the seam allowances while laying out the pattern on the material at the time of cutting. If you do not have much experience in cutting and want to avoid the risk of cutting without seam allowance, you may add the seam allowances to your paper pattern itself after completing the draft.
4. The following constructional details and information should be recorded and marked clearly as shown in the figures.
(a) Name of each piece of the patterns (Bodice front, Bodice back, Sleeve etc).
(b) Number of pieces to be cut with each pattern piece , for example (for a back open dress you have to cut 1 front, 2 backs, and 2 sleeves).
(c) If seam allowances are not included in the draft, this should be mentioned. If the seam allowances are included, seam lines and cutting lines should be clearly shown.
(d) Lengthwise or straight grain lines should be drawn with a red pencil as shown by (<---→)on all the pattern pieces. This line indicates that the pattern should be kept on the cloth in such a way that the line is parallel to the length of the cloth or the selvedges. It is usually drawn to the Centre front and Centre back edges of the pattern.
(e) Provide the matching notches or balance marks if necessary along the seams to show which seams are to be joined together and where.
(f) Centre front and Centre back line should be marked. It is advantageous to cut outward notches at the Centre front and the Centre back of the pattern pieces because at the time of assembling the garment, notches on the collars can be matched to notches on the neck line of garment etc
(g) Fold lines should be clearly shown. Fold lines appear along the centre front or centre back edges and sometimes along the hems to show where the material is to be folded.
(h) Dart markings, pleat markings etc. should be clearly shown.
It is convenient if you provide the slashes and notches at the tips of the darts, base of darts and at the two ends of the seam lines (if the seam allowance are included in the draft) because the dart markings and the seam lines can be easily transferred through these with chalk or pencil to the fabric at the time of cutting which is shown in the figures for slashes and notches.

DRAFTING THE ADULT'S BODICE AND SLEEVE PATTERN:

SAMPLE MEASUREMENTS:

Bust 34", Waist 26", Hip 36", Back width 14",Shoulder to Bust 9", Distance between the bust points is 6 ½ ", Sleeve length 7".

BODICE PATTERN:

Construct rectangle ABCD as shown with the following dimensions, leaving an extension of 2 inches beyond CD and AB.
AB= ½ (Bust + 3 ½ " ease allowance) = ½ bust +1 ¾ " =18 ¾ " and BC=Back waist length + ½ " =14 ½ " . Label AD as center back and BC as center front. Mark AE=1/2 AB- ½". This will make the front width of the garment 2" larger than the back width. For children and women with the flat bust, take AE= ½ AB. Draw EF parallel to BC. Back pattern is drawn within rectangle AEFD as explained below. Mark AG= ½ back width =7". 1" below G and mark J, 1" below A. Connect JH as shown. This is the back neck line. Connect HK with a straight line. This is the back shoulder seam.

Mark EO= ¼ bust – 1"=7 ½". For those with the bust measurement less than 30", take EO=1/4 bust – ½". For children, this is taken as ¼ bust. Draw GL parallel and equal to EO and connect LO. Mark KX=1/3 KL=2 ¼" (approximately). Connect KXO as shown for the back armscye line. Mark one notch at Z as shown (Locate Z at the midpoint of OX). This notch should be matched to the notch on the back part of the sleeve pattern while assembling the garment.

Calculate the back waist measurement and front waist measurement as follows. Back waist = ½ waist – ½" =12 ½". Front waist = ½ waist + ½ "=13 ½ ". (Those with the trim figures and a flat stomach can take back waist and front waist as equal).

Mark DM= ½ back waist +1 ¼" . (1" for dart and ¼" for ease). Connect OM for back side seam.

BACK DART:

Mark N, Midpoint of DM. Draw NP perpendicular to DM and equal to OF-1". Mark NQ= NR= ½ ". Connect PQ and PR.

Front pattern is drawn within the rectangle BCFE as follows: Mark BG1=AG- ¼" (½ back width – ¼")=6 ¾ ": BH1=AH- ¼ " =2 ½ "; BJ1= 1/12 bust + ¼" and G1k1=1".

Mark H2 , ¼" to ½" above H1, Join H2J1for neckline and H2K1 for the shoulder line. (Instead you may join the H1J1 and H1K1 but the above method will give the best fit for bust sizes above 31"). Draw G1L1O as shown. Divide the K2L2 into three equal parts and mark the X1 and Y as shown. Mark YY1=3/8" and XX2=1/2". Connect K1X2Y1O for front armscye line. Mark the two notches at Y1. (Front part of the sleeve will also will be cut with the two notches in a corresponding position and while joining the sleeve to the armhole these notches should be matched). Mark CM1= ½ front waist +1 ¾ "(1 ½ " for darts and ¼ " for ease). Connect M1C1 for the front hem line as shown in the figure.

FRONT WAIST LINE DART:

BS=shoulder to bust point + ¼" ease. ST= ½ distance between the bust points. (This will be about one tenth bust). Mark P1, ¾ " below T. Draw P1N1 as shown. This is the fold line of the dart. Mark Q1 and R1 ¾" on either side of N1, and connect P1 Q1and P1R1. These are the stitching lines of the dart. This dart is called as the waist line dart.

SIDE SEAM DART:

This dart may be introduced as follows. Mark M2 1" below M1 and connect M2C1 and OM 2 as shown. On OM2 mark U about 1 ½" below the level of T and connect UT. On UT, mark the TU1=1 ½". Mark V and W ½" on either side of U and connect VU1 and WU1 as shown.

CUTTING OUT THE PATTERN:

Cut out the back pattern along JHKXOMDJ and front pattern along J1H2K1X2Y1OM2C1J1and label them with necessary details. Check the fit of the patterns by holding them in position on your figure as explained in the chapter later and illustrated in the figure.

SLEEVE PATTERN:

Take a paper with length = sleeve length = 7" and width = ½ bust- 3"=14". Fold the paper lengthwise throughout the middle. In the first figure, ABCD represents this folded paper with the fold along AD. Hence AB=1/2 bust -1 ½"=EO of the figure 2 minus ½" and AD=BC=Sleeve length. Mark straight grain parallel line to AD. Mark BE= ½ AB=3 ½". Connect AE by a straight line. Divide AE into four equal divisions and mark them as a,b,c as shown. Mark cg=1/2",bf=1/4"ad=5/8" and ae=1/4" in the directions shown. Connect the AgfeE with a bold line. This is the back sleeve cap seam line. Connect the AgbdE as shown

with the dotted line. This is the front sleeve cap seam line. Mark CF=1/2" to 1". Connect EF. This is the side seam of sleeve.

CUTTING OUT THE SLEEVE PATTERN:

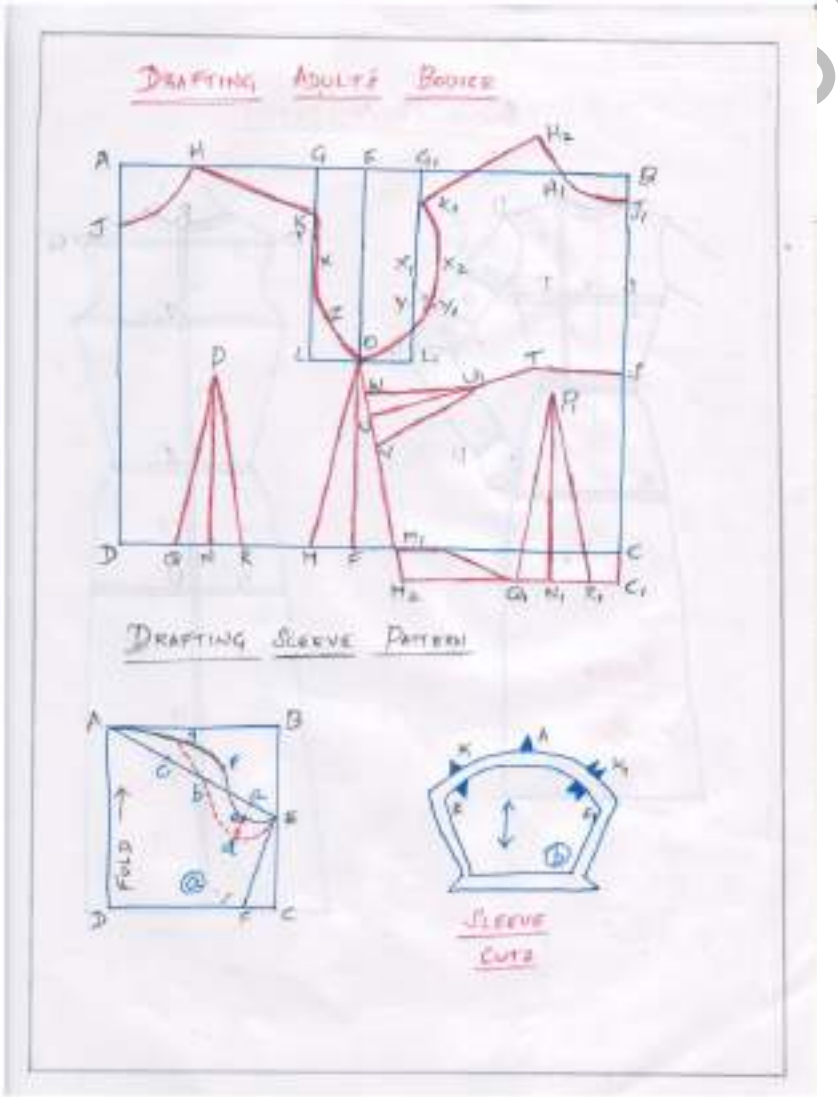
Cut both layers of paper along DFE and then along back sleeve cap seam line (bold line). Now open out the sleeve and cut the top layer only along the front sleeve cap seam line. Label the sleeve pattern as shown in the figure.

On the back sleeve cap line, mark a point K in such a way that EK=1/3 EA. Similarly on front sleeve cap line, mark the E1K1=1/3 E1A. Mark the one notch at K and two notches at K1. As explained earlier, these notches will help you to assemble the garment correctly. Mark one notch at centre of the sleeve (at A). This notch will be matched to the shoulder seam on bodice while constructing the garment.

SEAM ALLOWANCES:

These are not included in the pattern. Recommended allowances are as follows: Sleeve cap seam line 3/8" to ½" (same as for the armscye line); side seam or under arm seam ½" to 1", sleeve hem-1".

The second figure shows the full sleeve pattern, prepared with the seam allowances left beyond the seam lines and notches cut outwards.



DRAFTING CHILDREN'S BODICE PATTERN:

SAMPLE MEASUREMENTS:

Chest 24", waist length 10.5", waist 23", back width 11", sleeve length 5".

BODICE PATTERN:

For children, back and front pattern can be drafted within the same rectangle because it is not necessary to make the front larger than the back.

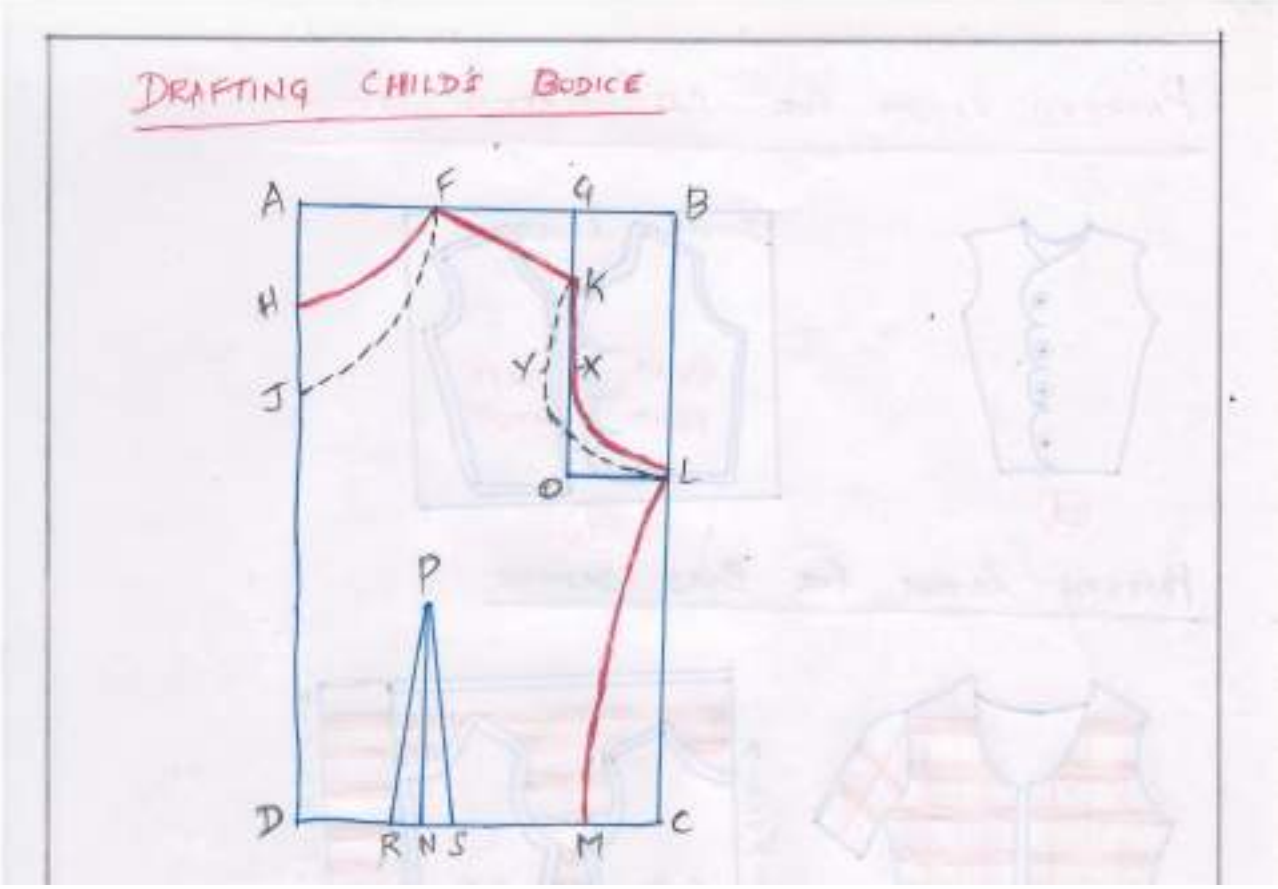
Construct the rectangle ABCD with the following measurements.

AB=1/4 (bust +5" ease allowance) =1/4 bust +1 1/2 " =7 ½ ". AD=BC=back waist length +1/2". Mark AG=1/2 back width =5 ½ ". AF=1/12 chest =2". AH=1". AJ=1/12 chest +1/4"=AF+1/2"=2 ¼" and GK=1". Connect HF with a bold line as shown. This is the back neck line. Connect JF with the dotted line as shown. This is the front neck line. Connect FK with a straight line. This is the shoulder seam. Mark BL=1/4 chest =6". Draw GO parallel to and equal to BL. Mark KX=1/3 KO and XY=1/2". Connect KXL as shown with a bold line. This is the back armscye line. Connect KYL as shown with a dotted line. This is the front armscye line. Mark CM=1/2". Connect LM. This is the side seam.

For dart, mark DN=1/2 DM-1/2" and NP= CL-1". Mark R and S ½" on either side of N and connect the RP and SP.

For children below 5 years, omit the dart in the front of the garment. Keep a sheet of paper below the paper in which you drafted the bodice pattern and cut both layers of paper along the outline of the back pattern (HFKXLMDH). Now lift the top layer of the paper and cut along the dotted lines along the front neck line JF and front armscye line KYL).

SEAM ALLOWANCES: Same as for the adult's bodice patterns.



SLEEVE PATTERN:

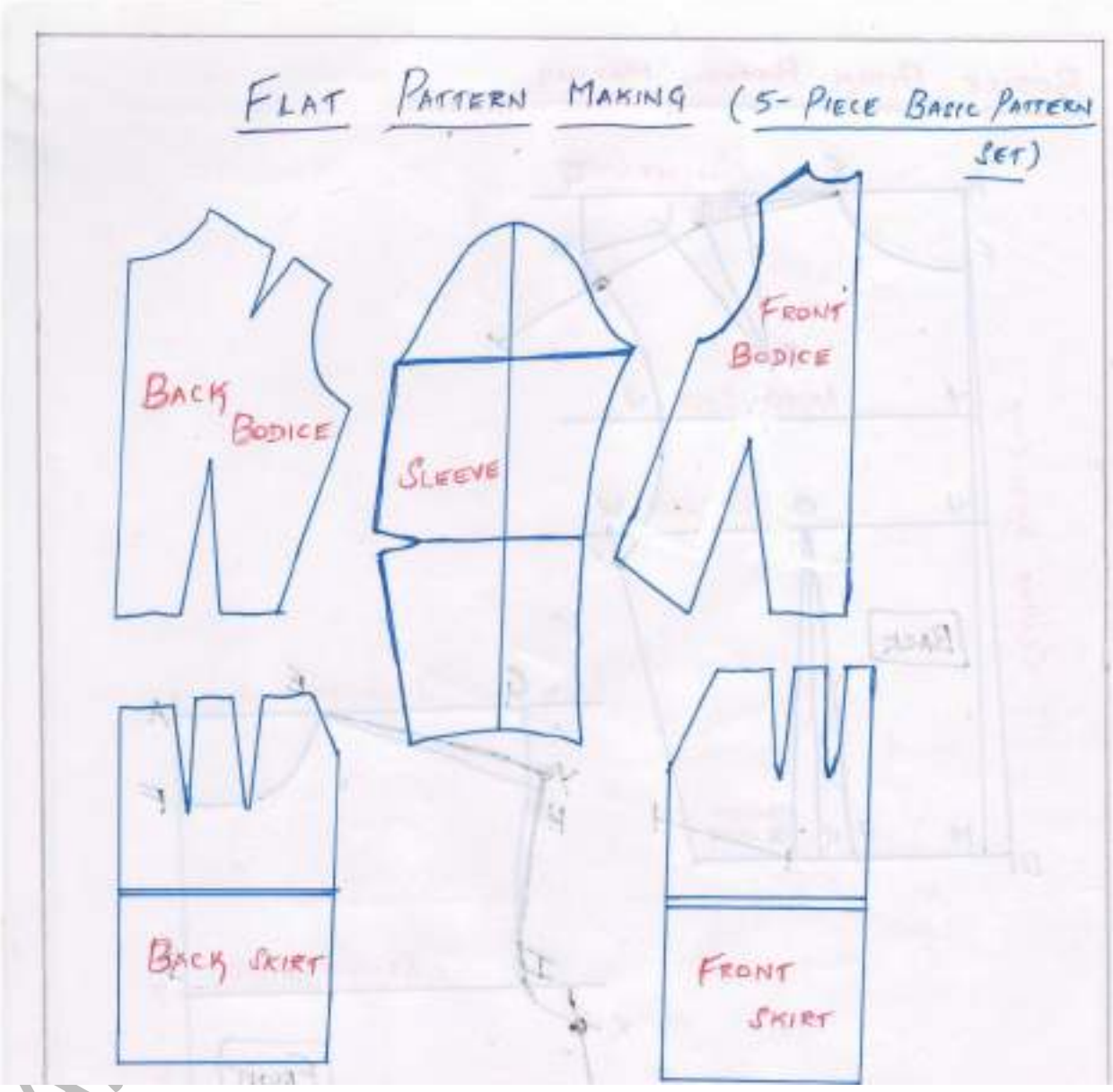
The sleeve is drafted in the same manner as an adult's sleeve except for a few differences. Hence a separate diagram is not given for the child's sleeve pattern. AD is on fold and is equal to the sleeve length. AB=1/4 bust -1/4" (for adults this was ¼ bust -1 ½"). Mark BE=1/2 AB and AB and DF=1/2 lower arm + ¼". Connect AE. Divide it into 4 equal parts and mark as a,b,c. Mark cg=1/2" ,bf=1/4", ae=1/4", and ad=1/2". Connect AgfeE(back armscye line) and AgbdE(front armscye line). Cut out the sleeve label and it as explained in the adult's sleeve.

SEAM ALLOWANCES: Same as for the adult's sleeve patterns.

FLAT PATTERN TECHNIQUES:

- Pattern making is a highly skilled technique which calls for technical ability, and a sensitivity to interpret a design with a practical understanding of garment construction.
- Pattern making is basically an art of manipulating and shaping a flat piece of fabric to conform to one or more curves of the human figure.
- The flat-pattern method uses the twelve basic pattern slopers that are manipulated by the pattern maker to achieve the desired style or design.
- The flat-pattern method is where the entire pattern is drafted on a flat surface from the measurements, using rulers, curves and straight-edges.
- A pattern maker would also use various tools such as notcher, drill and awl to mark the pattern
- The main and one important advantage of this technique is that the newly developed designer pattern retains the size of the original basic pattern. Grading in different sizes can be done very easily by the flat pattern techniques.
- It saves the time and energy to be otherwise wasted in making the pattern for different sizes.
- It involves the development of a fitted basic pattern with comfort ease to fit a person or body forms.
- A sloper is the starting point of flat pattern designing. It is a simple pattern that fits the body with just enough ease for the movement and comfort (Shoben and Ward).
- Five basic pattern pieces are used for the women's clothing. They include a snug fitted skirt front and back with the darts.
- However, as fashion changes frequently women's styles fluctuate frequently. These basic slopers are then manipulated to create the fashions.
- A basic sloper has no seam allowances, which facilitates its manipulations to various styles. It has no design interest, only construction lines are marked on it.
- It is necessary that the basic structure of a sloper should be such that the adjustments can be introduced easily.
- For a good pattern making, accurate measurements are of utmost importance.
- The right fit is the key to gaining consumer confidence and loyalty.
- Once a brand target fit has been defined, it must be welded intelligently to maintain a competitive advantage.
- Flat pattern making, when done correctly, provides the code to this integral part of the brand's DNA and helps ensure competitiveness in a challenging market place.
- Flat pattern technique is a method of manipulating the pattern while the pattern is laid flat on the table.

- Pattern manipulation is a common word applied to the act of slashing and spreading or pivoting the pattern section to alter its original shape.
- Darts play an important role in the flat pattern technique.
- The darts can be stitched to any location around the pattern's outline from the pivot point without affecting the size and fit of the garment.

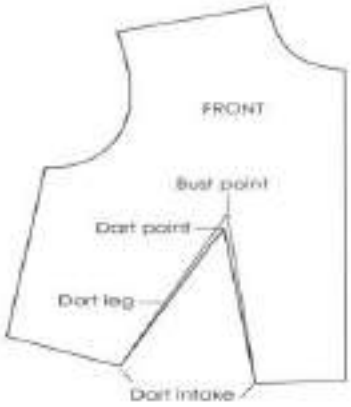


There are two methods of flat pattern technique which are as follows :

1. Pivot method: Darts can be moved from one point to another.
2. Slash and spread method : Darts are shifted by cutting and spreading the pattern.

How to Manipulate Darts

- Two methods (same result)
  - Pivot
  - Slash & spread
- Pivot point:
  - Designated point on the pattern (e.g. **bust point**).
  - Pattern is slashed to, or pivoted from, this point.
  - Allows dart to be moved without changing the pattern's size or fit.
- Dart point
- Dart leg
- Dart intake



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PIVOT METHOD:

Pivoting is a technique used to check that seam lines match together. A ruler is normally sufficient when a seam is straight, but when it comes to curved seams, pivoting is a fast and easy way to check that the seams are exactly the same length.Pivoting is one of the methods of moving (or manipulating) darts that is used with the Bodice Bock.

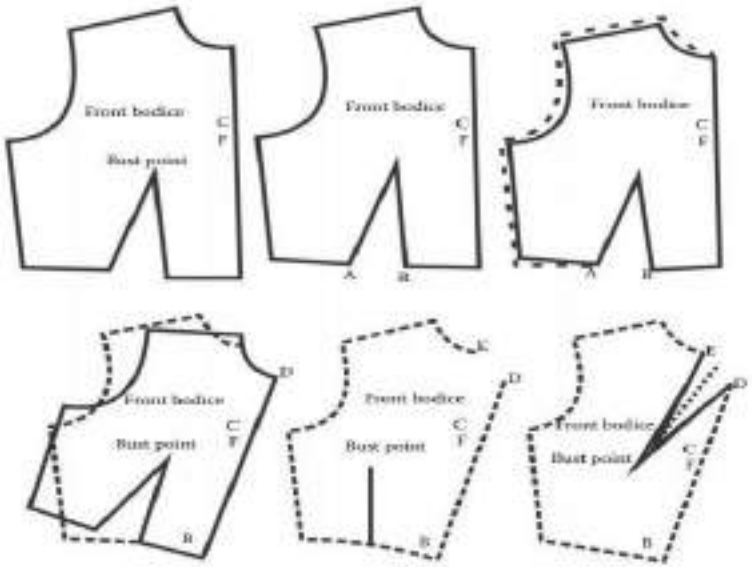
The standard Bodice Block usually has two darts in either

(i) the side seam and waist, or

(ii) shoulder seam and waist.

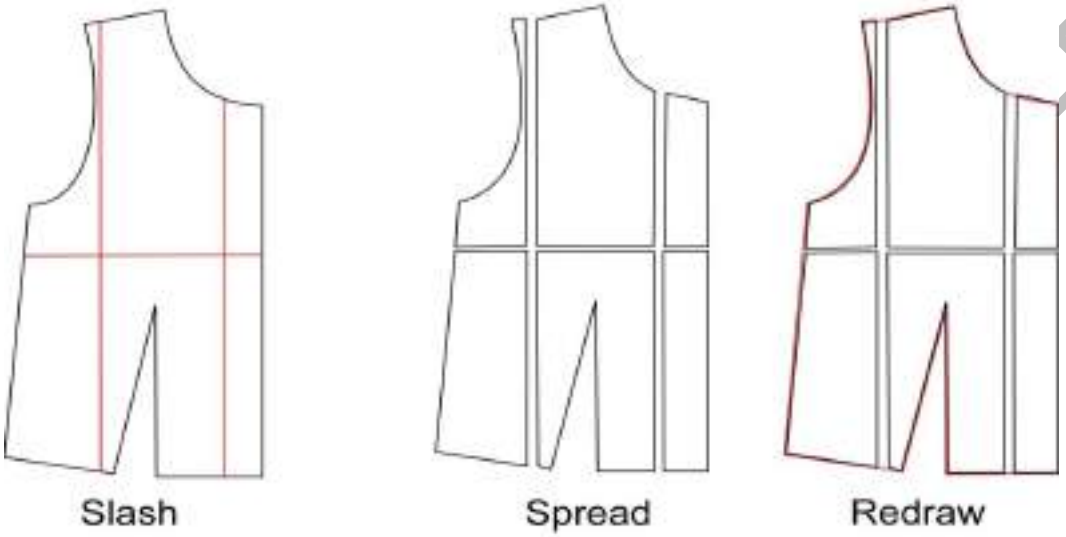
These darts can be moved to anywhere on the edges of that block for example: armhole, neck, centre front.

The pivoting method involves tracing around part of the block, holding the block down at the Bust Point, pivoting the block and then tracing the remainder of the block.



SLASH AND SPREAD METHOD:

Slashing and spreading is a patternmaking technique used to add more volume to a garment. You can use it to add pleats, gathers or even sweep. With this technique, you're going strategically slash your paper pattern to create more volume, so you can change the shape of a sleeve, a bodice, or even a dress. The slash and spread method is a technique used to manipulate darts on patterns – usually around the bodice but it can also be used on other pattern pieces that have darting. Slashing and spreading darts is a simplified version of the second method of dart manipulation. The slash method, both slash and spread and slash and close is a fundamental pattern making technique in which a pattern piece is cut or slashed and then spread apart to add fullness or closed to reduce fullness.



UNIT II

PREPARATION OF PAPER PATTERNS:

A basic pattern can be prepared by one of two methods: (1) by drafting (2) by draping fabric on a model or on the person concerned. Drafting may be defined as a system of drawing patterns on paper with a mechanical precision, on the basis of the body measurements. This is an effective and economical method which can be learned easily unlike draping which requires a model, a lot of fabric and considerable skill. The basic pattern may be modified to develop patterns for varied styles by a technique called as the "flat pattern designing." This is also sometimes classified as (rather imprecisely) as a third method for preparing patterns. The basic pattern is also referred to as Sloper, Block, Master or Foundation pattern. It consists of five pattern pieces- bodice front, bodice back, skirt front, skirt back and the sleeve. The basic pattern should have only a minimum number of darts and seams and it should fit the body measurements comfortably without being tight or loose.

ADVANTAGES OF PAPER PATTERNS:

(1) A good pattern of right size has been adjusted to suit your individual requirements will enable you to obtain a good fit.

(2) A pattern prepared on thick paper or card board can be preserved for a long time and can be used over and over again.

(3) By manipulating the basic pattern pieces it is possible to produce the patterns for complicated and original designs (For example, the basic sleeve can be adapted for a puff sleeve or bell sleeve etc).

(4) A paper pattern of a particular size can be used to make the new patterns of proportionately larger or smaller sizes by following a systematic procedure called as Grading.

(5) Cutting with the help of a paper pattern is quicker and easier than drafting the straightaway on the fabric.

(6) Use of a paper pattern will enable you to cut the garment with a minimum amount of fabric because it is possible for you to try out the placement of pattern pieces in different ways till you have found the most economical way to keep them.

TYPES OF PAPER PATTERNS:

1. Commercial patterns prepared on the basis of standard measurements.
2. Patterns drafted using personal measurements.

COMMERCIAL PATTERNS:

SELECTION OF COMMERCIAL PATTERNS:

Patterns for women's and children's garments are usually sized according to the bust measurement. Pants and skirts are sized according to the waist, hip and length measurements. Hence before selecting the pattern, you should take the body measurements accurately and buy the correct size. The measurements listed on the pattern envelope are the actual body measurements (Note : The pattern pieces will be somewhat larger, since a certain amount of ease allowance is included. The amount of ease will vary with the manufacturer and the garment design).

MERITS:

Reputed companies standardize their patterns after doing a lot of research and trying out the fit on the models. If your measurements have the same proportions as for the standard size figure it would be simpler to buy a commercial pattern than to draft one yourself. So the commercial pattern saves you time and effort. It may even give a better fir than a home- made pattern if you are inexperienced.

DEMERITS:

Commercial patterns are expensive

Secondly, patterns for different types of garments are not readily available in India, and good patterns are especially hard to get it.

For people whose measurements don't have the same proportions as the standard figure, commercial patterns do not give good fit without some alterations. Pattern alteration processes are rather complicated and may prove more laborious in practice than drafting a pattern based on one's own measurements.

Commercial patterns are made on thin paper and a pattern can rarely be used more than once, unless you copy it on to thick paper for further use.

PREPARATION OF COMMERCIAL PATTERN:

A basic pattern can be prepared by one of two methods either by drafting or by draping fabric on a model (or person concerned). Drafting is otherwise called as block pattern method

The three information elements of a commercial pattern are as follows:

- The envelope
- The cutting out and construction instruction sheet
- The pattern tissue pieces.

The making of industrial patterns begins with an existing block pattern that most closely resembles the designer's vision. Patterns are cut of oak tag (manila folder) paper, punched with a hole and stored by hanging with a special hook. The pattern is first checked for accuracy, then it is cut out of sample fabrics and the resulting garment is fit tested. Once the pattern meets the designer's approval, a small production run of selling samples are made and the style is presented to buyers in wholesale markets. If the style has demonstrated sales potential, the pattern is graded for sizes, usually by computer with an apparel industry specific CAD program. Following grading, the pattern must be vetted; the accuracy of each size and the direct comparison in laying seam lines is done. After these steps have been followed and any errors corrected, the pattern is approved for production. When the manufacturing company is ready to manufacture the style, all of the sizes of each given pattern piece are arranged into a **marker**, usually by computer. A marker is an arrangement of all of the pattern pieces over the area of the fabric to be cut that minimizes fabric waste while maintaining the desired grainlines. It's sort of like a pattern of patterns from which all pieces will be cut. The marker is then laid on top of the layers of fabric and cut. Commercial markers often include multiple sets of patterns for popular sizes. For example: one set of size Small, two sets of size Medium and one set of size Large. Once the style has been sold and delivered to stores – and if it proves to be quite popular – the pattern of this style will itself become a block, with subsequent generations of patterns developed from it.

DEVELOPMENT OF COMMERCIAL PATTERNS:

Commercial patterns were first made in the USA in the 1850's by Ebenezer Butterick who was a tailor. In the beginning they were crude patterns in rough paper, for simple designs only. The first patterns were for the men's and boy's clothing. Patterns for women and children were also developed later and became available commercially. You may have seen fashion magazines like Vogue, McCall's Pictorial, Simplicity etc and their pattern books. Commercial patterns are usually done on tissue paper, since tissue paper is not bulky, it allows many pieces of pattern to be packed compactly in an envelope. In commercial patterns seam allowances are included for safety. Patterns of established companies are usually printed and marked clearly with the straight grain lines, centre lines and all the necessary constructional details. Good patterns are carefully labelled with the following information:

the pattern size, name of each pattern, (back, front and sleeve), number of pieces to cut from each pattern pieces etc. In addition some companies provide instruction sheets explaining the steps involved in using the pattern to cut the garment, transferring the pattern markings, and constructing the garments.

In India, there are very few concerns making the paper patterns probably because there is not much demand for them. Unlike in foreign countries we have the facility to get our clothes custom tailored at fairly reasonable rates. Housewives and women who know a little bit of tailoring prefer to make their own patterns rather than buying expensive ready made patterns. This may be another reason for the lack of demand for the commercial patterns.

BODY MEASUREMENTS:

IMPORTANCE:

In order to construct garments that fit well, body measurements must be taken with precision. You can draft the original patterns based on these measurements which can be used as the basis of a variety of styles. If you do not want to take the trouble of drafting your own patterns, you may buy commercial patterns, but to select the pattern of correct size and later to make the pattern adjustments to fit your figure you have to know your own measurements.

PREPARATION FOR MEASURING:

For taking the measurements, use a good quality measuring tape which is sturdy and will not stretch. It should not however be too stiff – it should be pliable. The metal end of the tape should be used for vertical measurements and the other end for the horizontal and circumference measurements. The measurements should be taken over a smooth fitting foundation garment and never over bulky garments. Before taking the measurements, tie a cord or a string around the waist. Next, take a ¼" wide tape and cast it around your armhole. This will make it easier to measure the width of shoulders, armscye depth etc. Stand erect with the arms hanging straight at the sides while measurements are being made by some one else. (It is possible though less convenient and less accurate to take your own measurements). Take snug measurements rather than tight or loose ones. Hold the tape parallel to the floor for horizontal measurements, and perpendicular to the floor for the vertical measurements. As the measurements are taken, record them in a note book.

The measurements needed will depend on the type and style of garments you are making and the age and sex of the intended user. The remainder of this chapter deals with the important measurements needed for the construction of garments for ladies, children and men.

PRINCIPLES OF TAKING BODY MEASUREMENTS:

Body measurements refer to measuring the actual person (or people) who will wear a garment. These are different from garment measurements and can be taken manually or purchased from different body data services. Many body measurements are important to building a balanced, well-fitting garment

In human body measurement, these three sizes are the circumferences of the bust, waist and hips; usually rendered as XX–YY–ZZ in inches,orcentimeters.A good quality flexible measuring tape should be used. Measurements should be taken on correct fitting garments. Special care should be taken while taking measurements for kids and elders, they should stand straight without bending. The person for whom the body measurements are taken should stand straight

In order to measure the body parts correctly, the following precautions should be observed.

1. Measurement should be taken over usual and fitted garment.
2. The measuring tape should not be pulled while measurement is taken.

3. Use metric s, it is more accurate and easier to use.
4. A firm tape should be used.
5. Each measurement should be recorded as soon as it is taken.
6. Measure and record correctly
7. The person being measured should stand correctly (erect)
8. Use non-stretchable tape (sturdy tape)
9. Round the Measurements to the nearest whole numbers, especially when the centimeters are used.
10. Measurements should be taken at the appropriate position (Land marks).
This can be done by tying a piece of rope around the Land marks e.g. waist and hip areas.
11. A proper order/sequence should be followed in taking the Measurement to make it more systematic.
12. Maintain conservation with the person being measured for proper relaxation.
13. Do not measure yourself; instead another person is needed to take your Measurement.

LADIES MEASUREMENTS:

BODICE MEASUREMENTS:

1. **Bust** :
Measure around the fullest part of the bust raising the measuring tape slightly to a level just below the shoulder blades at the back
2. **Waist:**
Measure snugly around the waist (where you tie the cord) keep the tape parallel to the floor.
3. **Neck:**
Measure around the neck, passing the tape just above the collar bone in the front and along the base of the neck at the back.
4. **Shoulder:**
Measure from the neck joint to the arm joint along the middle of the shoulder (A to B).
5. **Front Waist Length:**
Measure down from the neck at the highest point of shoulder to the waist line through the fullest part of the bust (A to C).
6. **Shoulder to Bust :**
Measure down from the highest point of shoulder to the tip of the bust (A to D).
7. **Distance between the bust points:**
Measure in the horizontal direction, the distance between the two bust points. (D to E).
8. **Back Width or across back measurements:**
Measure across the back from the armhole to armhole about 3 inches below the base of neck (P to Q).
9. **Back waist length:**
Measure from the back of the neck at the centre back to the waist line (R to S).
10. **Armscye depth:**
Measure from the base of neck at the centre back to a point directly below it and in the level with the bottom of the arm where it joins the body (R to T).

SLEEVE MEASUREMENTS:

11**. Upper arm circumference**:
Measure around the fullest part of the arm.
12. **Lower arm:**
Measure around the arm at the desired level corresponding to the lower edge of the sleeves.

13. **Elbow circumference:**
Measure around the arm at the elbow.
14. **Wrist:**
Measure around the wrist.
15. **Sleeve length:**
For short sleeve length, measure down from the tip of the shoulder at the top of arm to the desired length of the sleeve (B to F) . For elbow length sleeve measure from top of arm to elbow point (B to G). For full length, bend the elbow slightly and measure down from top of arm to back of wrist passing the tape over the elbow point (B to H).

SKIRT MEASUREMENTS:

Waist : Same as for the bodice.
16. **Hip:**
Measure around the fullest part of the hip horizontally. (This level will be about 7 to 9 inches below the waist for an average figure).
17. **Waist to hip:**
Measure down from the waist at the centre back to the fullest part of the hip (S to U).
18. **Skirt Length:**
Measure down the centre back from the waist to desired length of skirt (S to V). Length from the waist to the floor can be taken at the same time and the difference between the two is noted. The difference will give the number of inches the skirt is above the floor level.
After taking your measurements, compare them with the "sample measurements" for Ladies garments. Any measurements which appears too small or exaggerated must be rechecked at once.

CHILDREN'S MEASUREMENTS:

If you compare this table with the ladies measurement table, you will find that some additional measurements are listed here. These are explained below:

THIGH GIRTH:
Measure around the widest part of the thigh. This measurement is useful while stitching of children's short pants, girl's bloomers etc., especially if you are inserting an elastic in the thigh part of the garment.

CERVICAL HEIGHT:
Take the height vertically from the nape of the neck to the ground.

CROTCH LENGTH:
Measure from the centre back of waist under the crotch to the centre front waist. This measurement is useful for the pants, pyjamas etc.,

FROCK LENGTH:
Measure down from neck at highest point of shoulder to the desired length along the front.

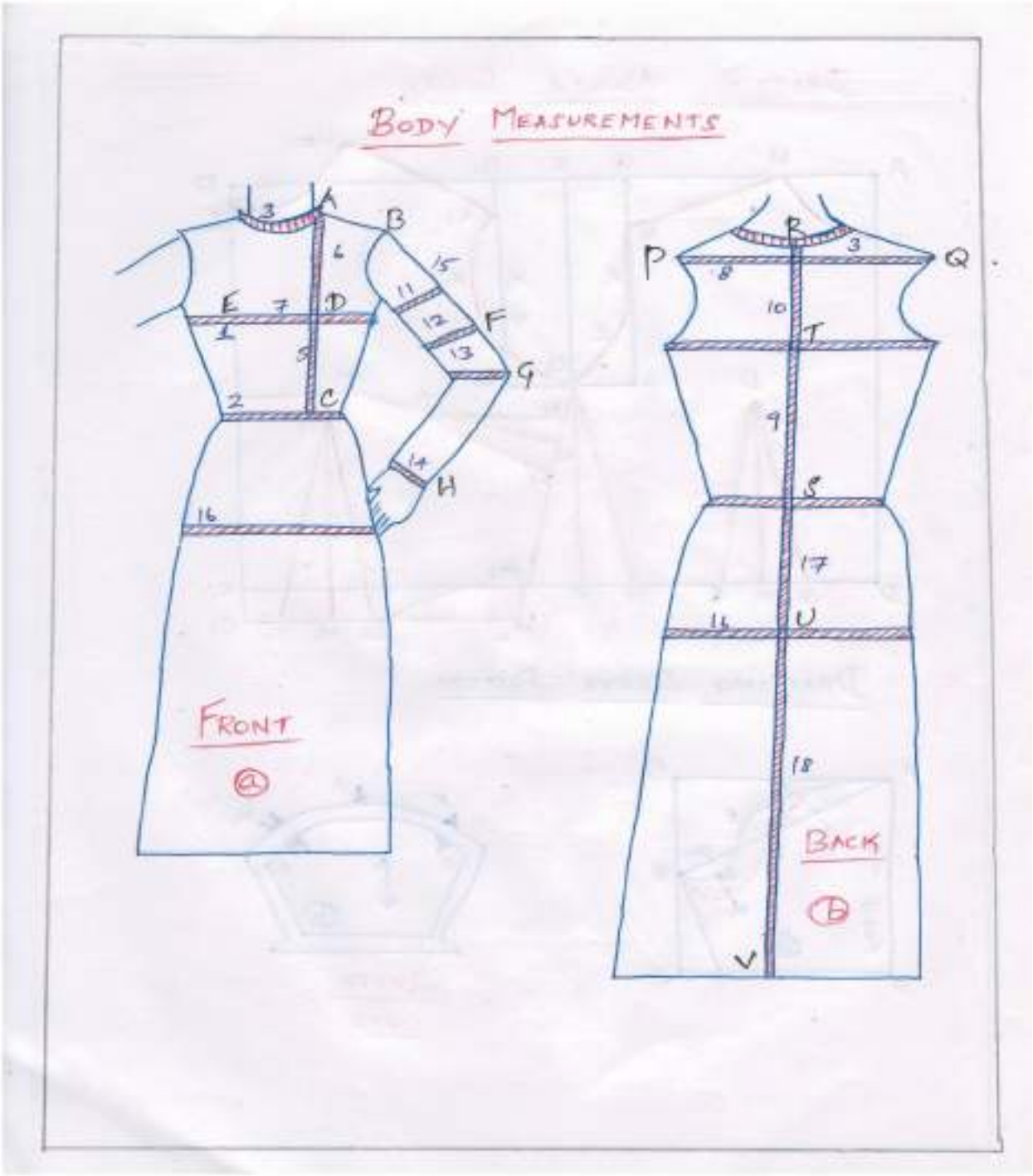
CHEST:
For children and men, bust measurement explained under Ladies measurements is referred to as the " Chest Measurements."

BOYS AND MENS MEASUREMENTS:

It can be seen from these that the fewer measurements are needed for the men's and boy's garments than the women's garments and that many measurements are common for both. Some measurements which have not been mentioned so far are explained below:

SHIRT LENGTH:
It should be measured from the neck at the highest point of shoulder to desired length along the front.

PANT LENGTH:
It is measured from the waist to ankle along the side of the body.
CUFF MEASUREMENTS:
It is estimated by measuring the wrist loosely and adding ½" overlap extension to it.



UNIT III

PATTERN LAYOUT:

DEFINITION:

A layout is a plan for the placement of pattern pieces on the fabric. There are various categories of layout marking like grainlines, place of fold brackets, notches

The placement of pattern on the fabric, in an economical manner, that is without wasting fabric is known as pattern layout. All the patterns should be arranged properly following grain of the fabric.The main advantage of a pattern layout is that it minimizes fabric wastage, thus helping to optimally utilize the fabric.

RULES IN PATTERN LAYOUT:

1. Press the fabric as well as the pattern pieces flat before laying the pattern on the fabrics.
2. Use a large table or any hard flat surface for accommodating your work.
3. If an open layout is used, place the fabric right side up on the table. For all the layouts, fold the fabric right sides facing and wrong sides out.
4. Decide on the best way to fold your cloth. This will depend on the width of the cloth, width of the your pattern pieces, the type of cloth and design of the garment (whether left and right halves are identical, whether many pieces have to be cut on fold etc.,
5. Make a trial layout by keeping weights or two pins per pattern, to make sure that the cloth will be sufficient. Rules 6 to 9 must be borne in mind while making the trial layouts.
6. Straight grain lines on the patterns must be kept parallel to the fabric selvedge. To ensure this, measure and adjust the pattern so that both ends of the straight grain line are the same distance from the selvedge (see the sleeve pattern) and pin the pattern to the fabric along the grain line arrows.
7. Fold lines on the patterns must be kept on the folded edge of the fabric.
8. Leave enough space between the patterns for cutting outward notches and marking seam allowances (if the patterns do not include the seam allowance). Also make sure that there is enough material left for cutting out belts, facings, pockets etc., for which you may not have made paper patterns.
9. The patterns must be placed on the fabric in the most economical way. Some hints on economical pattern placement are given below:

(a) Try different layouts till you find one that requires minimum length of the cloth. Start cutting only after all the pattern pieces are placed.

(b) Wider end of the larger pieces should be placed at the cut edges (along one edge or both the edges).

(c) Lay the pattern pieces close together.

(d) Place as many pieces as possible near the selvedge ends so that the left-over material will be in one large bit rather than in two or more smaller bits. This will maximise the space available near the folded end for laying patterns that have to be kept on fold.

(e) As far as possible try to fit the wide end of one piece beside the narrow end of another. (See the petticoat layout as shown in the figure).

(f) Fit pieces similar in shape next to the each other. This is called as the Dove tailing.

(g) If pattern pieces to be kept on fold are narrow, fold the material just wide enough to accommodate them (use off-centre lengthwise fold as in the fig). This will leave all the excess material together on one side.

(h) Make duplicates for the pattern pieces that have to be used twice and use them for making the trial layout.

10. Pin patterns to the fabric firmly. After placement of the patterns has been decided, pin the corners and the long outside edges of the patterns, placing pins close to and approximately perpendicular to the cutting line. Use just enough pins to keep the pattern in position. Too many pins will distort the edges. You should start cutting the fabric only after pinning all the pattern pieces placed properly in correct order.

The common methods of folding the cloth for laying out pattern pieces are the following.

METHODS OF PATTERN LAYOUT:

LENGTHWISE CENTRE FOLD:

Here the fabric is folded down the middle parallel to the selvedge so that the selvedges come together. This is the most frequently used fold. The layout for a simple frock on this type of fold is illustrated in the figure.

OFF-CENTRE LENGTHWISE FOLD:

This is used when the narrow pieces have to be cut on fold. To ensure that the fold is parallel to the selvedge, mark the points measuring the required distance (width of the half pattern including the seam allowance) from the selvedge at regular intervals and fold along the markings. The layout for a child's panty on this type of layout is illustrated in the figure.

CROSSWISE CENTRE FOLD:

This is suitable for the materials that are too narrow to accommodate the width of the pattern pieces when folded lengthwise.

OFF CENTRE CROSSWISE FOLD:

When only a part of the material is required to cut the pattern pieces that are too wide for lengthwise fold layout, this type of fold is used.

DOUBLE FOLD:

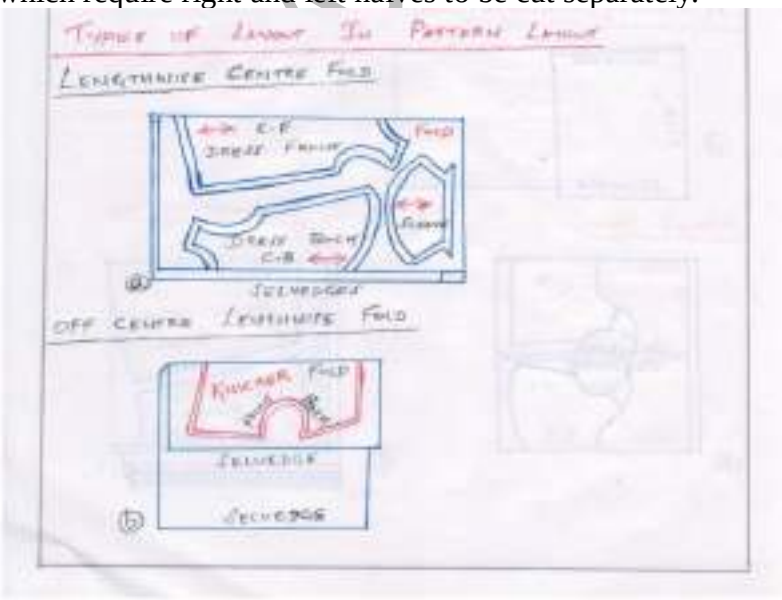
This is used when many pattern pieces that are not too wide must be cut on fold. For garments with no opening for the front and back sections, this type of fold can be used provided the cloth is wide enough to accommodate the patterns when folded this way.

COMBINATION FOLD:

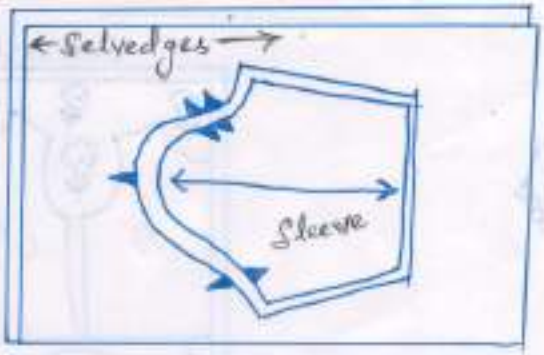
Here, lengthwise fold and crosswise fold are combined together.

OPEN LAYOUT:

In this type of layout, the fabric is not folded at all. This is used especially for the designs which require right and left halves to be cut separately.

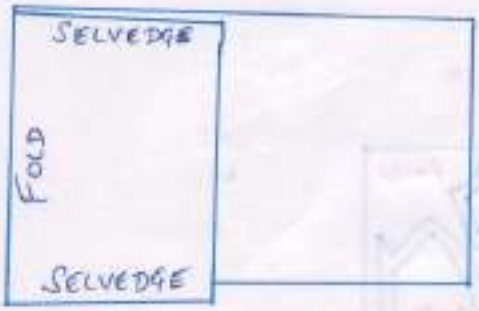


CROSSWISE CENTRE FOLD:



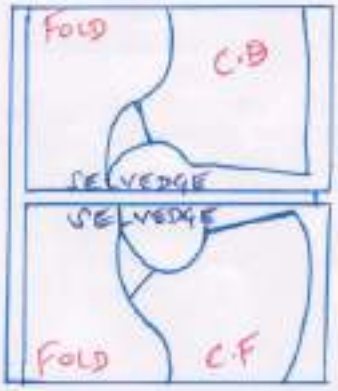
(c)

OFF CENTRE CROSSWISE FOLD:



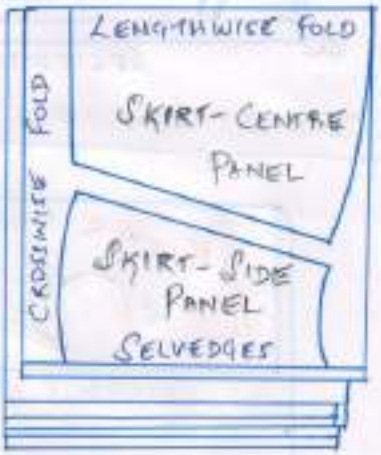
(d)

DOUBLE FOLD:

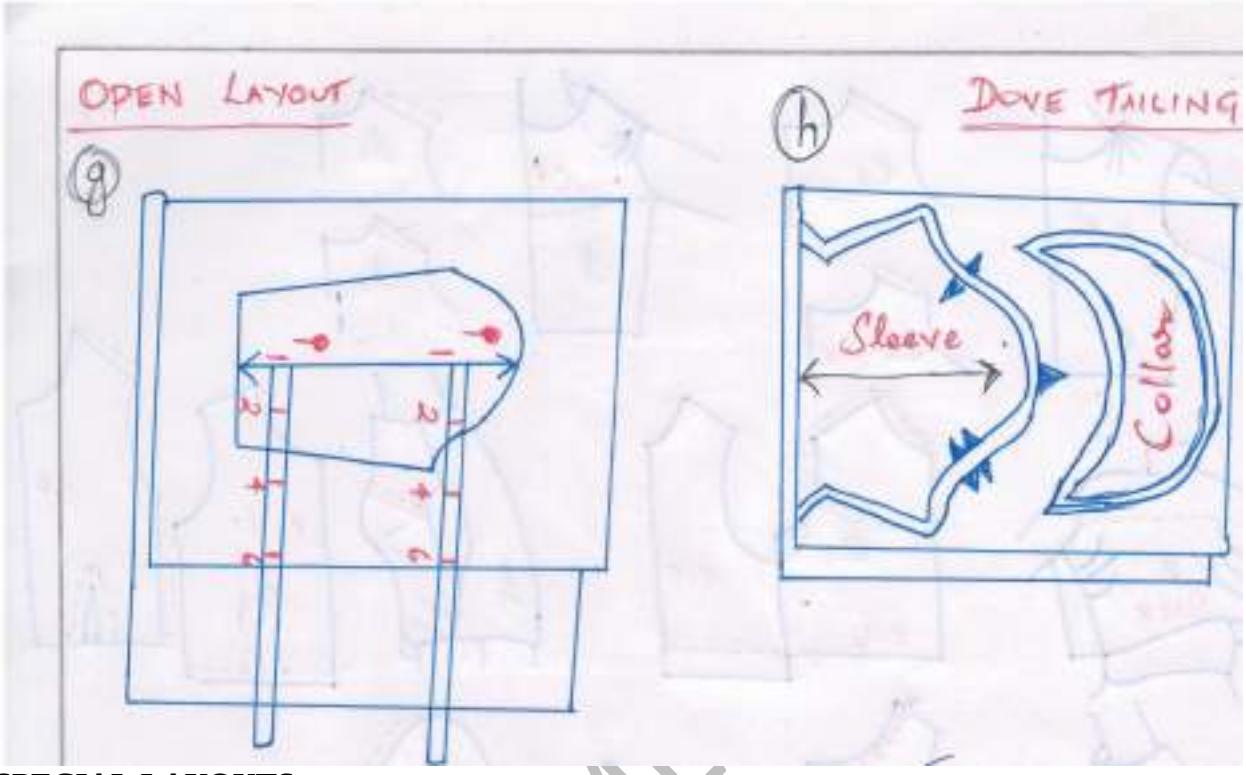


(e)

COMBINATION FOLD:



(f)



SPECIAL LAYOUTS:

(A) FABRICS WITH LENGTHWISE STRIPED DESIGN:

When cutting fabric with bold stripes, adjust the position of the pattern so that one of the prominent lines fall along the centre back of the garment and the remaining stripes are identical on the two sides of the fold. Finished appearance of the garment is finally shown in the figure. Striped material can also be cut on the bias forming a chevron design in the shape of the letter V at the centre front or the centre back seam or opening as shown in the figure.

(B) FABRICS WITH BOLD DESIGN:

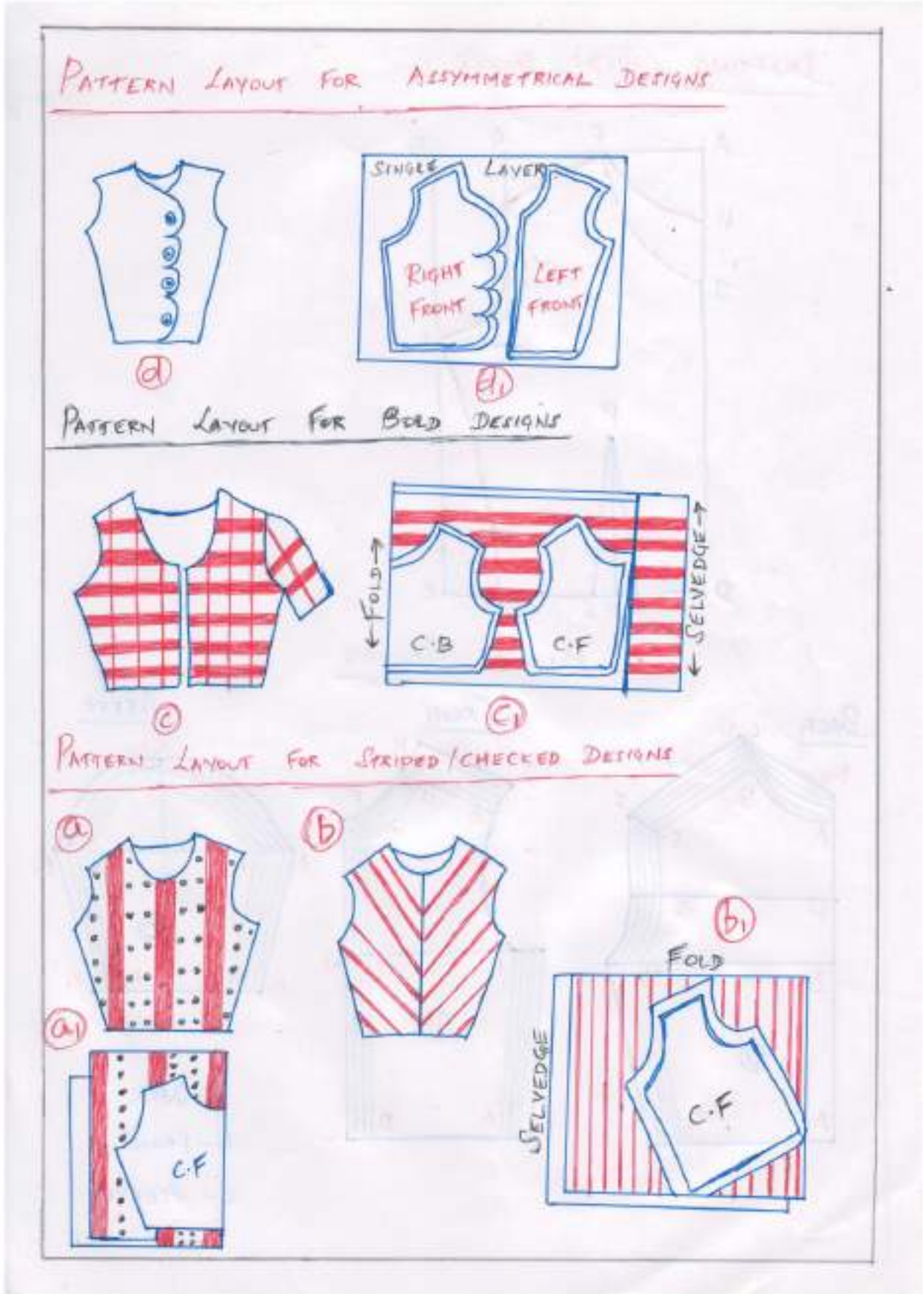
Match plaids and stripes so that they form continuous line across the seam openings or meet at equal angles. When you fold such fabrics to keep the pattern pieces, make sure that the stripes are matching exactly on both layers of the fabric, as shown in the figure. If the print is large and spaced or with sweeping curves, drape the fabric on your body and look in the mirror to see where and how the highlighting part of the design should be placed.

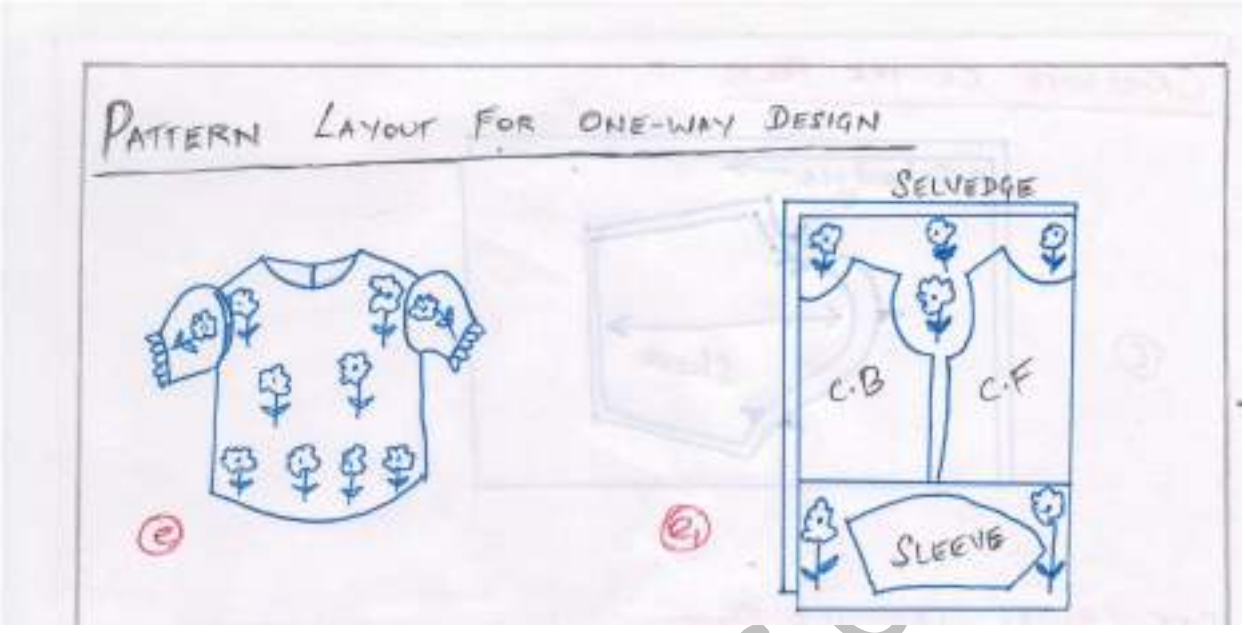
(C) FABRICS WITH ASYMMETRIC DESIGNS:

These designs call for right and left sides to be cut separately from a single layer of the fabric, taking care to see that you are not cutting both the sections for the same side. If the material has no right and wrong side, this problem will not arise. The figure shows a blouse with asymmetric design. Its layout is displayed finally.

(D) FABRICS WITH ONE-WAY DESIGNS:

When cutting these fabrics, you must take care to see that all the pattern pieces are arranged in the same correct direction as shown in the figure so that the finished appearance will be like in the figure otherwise the print will look upside down on sections which have been placed wrongly. Fabrics with nap and pile designs have to be treated with the one way designs.


PATTERN LAYOUT FOR ASSYMMETRICAL DESIGNS
SINGLE LAYER
RIGHT FRONT
LEFT FRONT
d
d1
PATTERN LAYOUT FOR BOLD DESIGNS
FOLD
C.B
C.F
SELVEDGE
c
c1
PATTERN LAYOUT FOR STRIPED/CHECKED DESIGNS
a
a1
C.F
b
b1
FOLD
SELVEDGE
C.F



ECONOMY OF FABRICS IN PLACING THE PATTERNS:

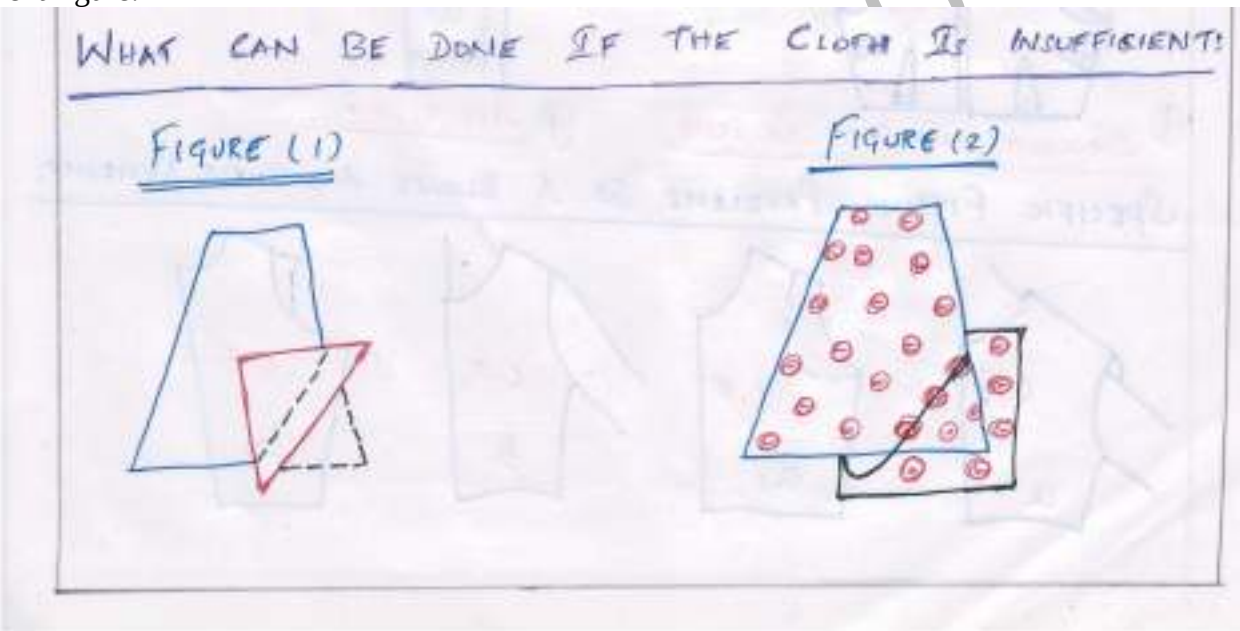
- Never mark or cut any pattern until trial shows the best location for all the pattern pieces.
- Make the temporary placements using the small weights.
- Begin with the largest pattern pieces at opposite ends of the cloth and work together towards the centre to fit in the smaller pieces.
- Place the wider ends of the patterns at the cut ends of the fabrics.
- Place all the pieces close to each other so that you can save the material which may be used for the fullness of the same garment or used for making the accessories like hair bands, rings etc.
- Cut notches outward if possible or inward if material is not enough.
- Follow the Dovetailing technique for the pattern laying, dovetailing is the placement of similar shaped patterns together. For example, a collar pattern can be placed closer to the Armscye line. This will help one to save the fabrics.
- In case the fabric is insufficient for a pattern, then a small piece of fabric can be added to the fabric, at the part where the pattern extends beyond the fabric. This technique is called as the Piecing.
- Balance the pattern and add small bits on either side of the pattern, which will result in the good drape. Example, the tip of a skirt hem might extend beyond the fabric, then place the pattern in the centre such that small pieces can be added on either side.

WHAT CAN BE DONE IF THE CLOTH IS INSUFFICIENT:

If the cloth is not sufficient, the simplest thing is to buy the extra fabric. But if it is not available, or you prefer to make do with what you have, the following procedures will help you.

(1) if possible, reduce the seam allowances, hem allowances, or length and width of some of the pattern pieces. Often you can do this without changing the fit of the garment by reducing the fullness(gathers, pleats).

(2) You may decide to cut some pieces on bias or crosswise grain. Some prints may look attractive if the yoke or sleeves are cut on the bias or crosswise grain.
(3) Pattern pieces which have to be cut on fold can be cut near selvedges and then joined up, with some trimming applied near the seam (example, box pleat with a harmonizing material, fagotting, lace etc.,) to make it look like the original pattern. You may even find that you end up with an interesting new design (necessity is the mother of invention).
(4) Use some other material similar in colour and texture to cut the parts that are not visible from outside.
(5) You may decide to modify the design of the garment. For example, if you were planning to have a puff sleeve, use a plain sleeve or omit the sleeve.
(6) Certain sections which ought to be cut in one piece may be cut out. In more than one piece and then stitched together if material is otherwise not sufficient. This technique is called as piecing. Piecing should be done inconspicuously with the design and grain matched. Piecing in solid coloured fabrics is shown in the figure and the printed fabrics is shown in the next figure.



ADJUSTING THE FABRICS TO THE PATTERNS:
Use the following guidelines when laying out your pattern pieces on your fabric.

- Circle your correct layout diagram on your pattern instruction sheet.
- Make any desired design alterations to your pattern before laying it.
- Follow the shading key shown on your instruction sheet.
- Avoid placing the pattern pieces on the selvedge edges of the fabric.
- When you are cutting two layers of the fabric, the pattern pieces do not have to be placed printed side up.
- Check for the pattern pieces that must be placed on the fabric fold, when cutting out three pieces, never cut along the folded edges.

Accurate measuring will help you make sure your pattern pieces are cut-out on-grain. Follow these steps.

- Place the each pattern piece so that the grain line arrow runs lengthwise on the fabric.
- Pin one end of the grain line arrow to hold it in the place.

- ❖ Measure from the pinned end of the arrow to the fabric selvedge edges.
- ❖ Now measure from the other end of the grain line arrow to the fabric selvedge edge.
- ❖ Pin the edges of the pattern piece in the appropriate place.
    - Special techniques are used when placing the pattern pieces on off-grain fabrics that cannot be straightened. For off-grain fabrics, with a stripped pattern, plaids or obvious horizontal designs, ignore the lengthwise grain. Instead, follow the print as such as possible. Make sure to follow these instructions.
- ✓ Match the design of the second piece with the first one.
- ✓ For the solid colour fabrics, lay the fabrics so that the selvedges are together.

UNIT IV

FITTING –DEFINITION:

Fitting is defined as the activity when someone tries on clothes to make sure they are the right size, or a small part that joins together other parts.

The garment fitting techniques refer to how well a garment confirms to the three dimensional human body figure. Good garment fit is crucial to ones the human body at most for its satisfaction.

Generally fit has two aspects comfort and appearance.

Good garment fit is crucial to ones the human body at most for its satisfaction. Anyway, it is often easier to find clothes in right columns, prices, and style that one likes to be considered as the psychological factor.

STANDARDS FOR A GOOD FIT:

The success of your garment depends a great deal on its fit. A well fitting garment has optimum amount of ease (neither too tight nor too loose) and its seam lines follow the general silhouette of the body. It hangs or sets in a well balanced manner without wrinkles, sagging or poking out.

The factors which determine whether a garment has good fit or not are ease, line, grain, set and balance. These factors are referred to as the Standards of a good fit. They are interrelated. For example, if a garment has excess ease or too little ease, the grain line go out of the position, wrinkles appear and the garment may lack balance.

EASE:

It is the difference between the actual body measurement and the garment measurement at any given point. This amount varies with the fashion, type of garment and personal taste. Recommended ease allowances for various parts of the body are given in the previous chapter. A garment constructed with optimum amount of ease will be of the right size. Pulling or drawing across the bust, shoulder blades, hipline etc are the evidence of insufficient ease. Excess ease causes the folds across the loose area giving a baggy appearance to the garment.

LINE:

Lines to look for in fitting are the basic silhouette seams, circumference seams and design lines. The shoulder seam should be straight across top of shoulder. The side seam should be straight and must be half way between the back and front. The circumference lines include the neckline, armhole, waistline and hemline. They should form the smooth curves following the natural body curves. The armhole should be oval shaped and should not curve too far into the bodice nor should it extend too far away from the natural joint. The neckline should fit well without pulling or gaping. Waistline and hemline should be parallel to the floor. Design lines such as pleats, darts, gores and yokes within the garment should be graceful and smooth.

GRAIN:

When a garment is worn, the fabric grain lines must fall correctly in the proper places at your figure. The lengthwise grain should be perpendicular to the floor at the centre front and centre back of the garment. In the sleeve the lengthwise yarns should hung vertically from the shoulder line to the centre of sleeve hem. The crosswise yarns should be parallel to the floor across the bust, waist, and upper arm of the sleeve. The solid lines and lengthwise grain lines (KL centre front line, PL centre back line and ST centre sleeve line) and the dotted lines are the crosswise grain lines (AB and CD across the bust lines and EF across the upper arm line).

SET:

A garment is said to have a good smooth set, if it has no undesirable wrinkles. Wrinkles at the slanting triangles caused by the garment being strained over some curve or bulge of the body. The wrinkles pointing towards the shoulder blade is caused by the protruding shoulders; and to remove them you must provide extra length and width for the garment in this area. If a garment is tight around its circumference crosswise wrinkles occur above or below the tight area.

BALANCE:

For a good fit, the garment shoulder look balanced from the left to right and front to back. The skirt should extend the same distance from the centre to the right and left sides. If the shoulder seam stands away from the shoulder at the neck point and then tightly at the armhole point, the garment looks out of balance.

CHECKING THE FIT OF A BLOUSE:

1. Put on the garment right side out over a good fitting brassiere. If there is a centre opening pin it closed, matching the centre lines on overlap and underlap. (Use several pins). Adjust the blouse so that the centre lines coincide with the centre of your figure.
2. Stand in front of the mirror and study the overall appearance of the blouse. Remember that the armhole, neckline and lower edge of the blouse have an extended seam allowance (the edge of the fabric is not the seam line).
3. Determine the fit of the blouse by checking the following points. (Though it is possible to do this by yourself, it would be better if you have someone experienced to assist you in fitting).

(a) Whether there are many changes needed in the length of the bodice, sleeve and shoulder seam.

(b) Whether it has the right amount of ease across the bust upper arm, back etc

(c) Whether the seam lines (Shoulder, Armscye, side seam, waist line, and neck line) follow the general silhouette of the body.

(d) Whether the grain lines are falling correctly in the proper places on your figure.

(e) Whether there are any wrinkles.

(f) Whether the darts are of optimum width and point towards the bust point ending with ¾" to 1 inches away from the bust point.

SOLVING FITTING PROBLEMS IN A BLOUSE:

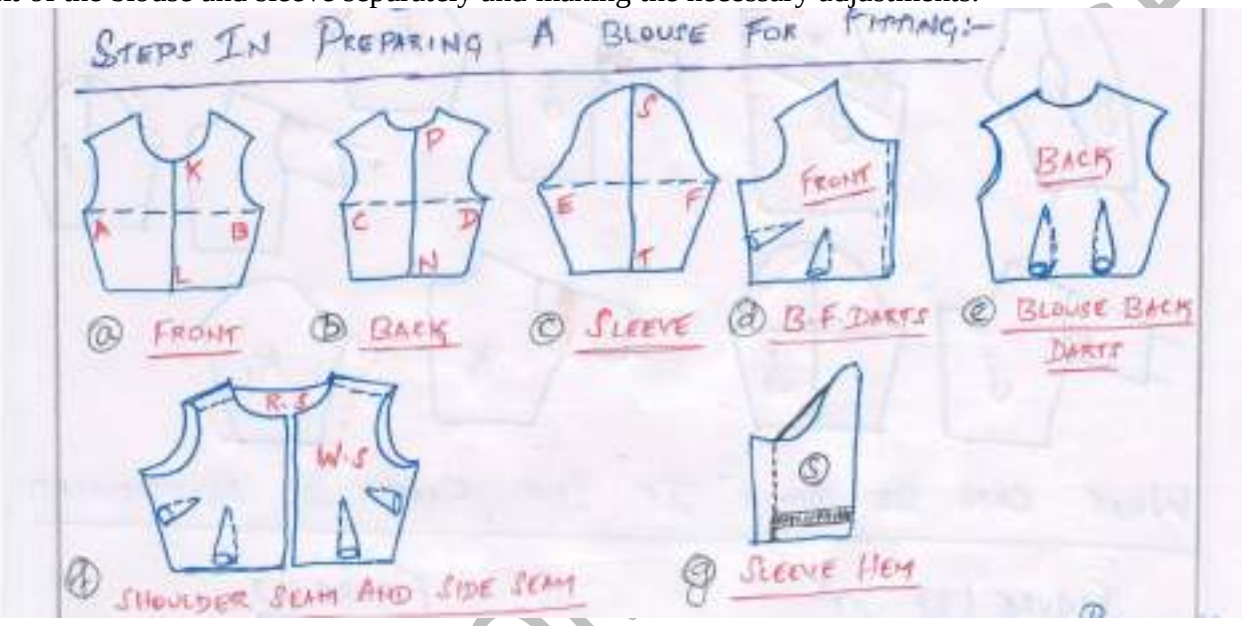
BASIC PRINCIPLES:

(1) If there is too little or too much of ease, let out the seam or dart near the tight area and deepen (i.e., take in) near the too loose area. Apparent tightness in one area may also be rectified sometimes by deepening the part of the seam where the garment is relatively loose. For example, if the blouse seems tight near the arm joint of the shoulder line, taking a deeper seam at the neck point of shoulder line may correct the problem.

(2) To get rid of diagonal wrinkles provide greater length and/or width near the pointed end of the wrinkle. Sometimes the problem is solved by decreasing the length of the garment at the opposite end, for example, if there are wrinkles pointing towards the shoulder near the arm joint, you may either let out the shoulder seam and retack reducing the seam allowances as you approach the arm joint or you may simply deepen the seam at the opposite and i.e., neck point. Both processes reduce the slope of theshoulder. By trial and error you have to see which procedure gives the best effect.

(3) If a crosswise grain is sagging, lift the sagging part by taking a deeper seam above it. If the grain line is curving up you have to do the opposite i.e., let out the seam above the rising part. Before making this adjustment, make sure that the off grain condition is not due to

faulty cutting. (4) To rectify a lengthwise seamline that curves or slants instead of hanging vertical, rip out the seam near the bulges (heavy bust, protruding back) which is the cause of the trouble, and retack the providing greater length and width for the bulge.
(5) To remedy an off balance condition, deepen the seam above the side which hangs down or let out the seam directly above the part which rises up.
(6) Fitting must be done over and over again until a perfect fit has been achieved. As mentioned earlier sleeve should be tacked to the armhole and tried on only after checking the fit of the blouse and sleeve separately and making the necessary adjustments.



FITTING TECHNIQUES:
(1) Since the fitting is done wearingthe blouse right side out, all changes needed will be marked on the right side, with a chalk, pencil or pins. They are to be transferred to the wrong side later (after taking off the blouse) for making necessary adjustments or alterations.
(2) Fitting is usually done only on the right hand part of the garment. Changes marked on the right hand side are to be transferred to the left hand side, so that the alterations are identical on both sides. If there are any imperfections they can be taken care of at the time of second fitting. (3) If a seam or dart has to be shortened or lengthened, mark the termination point, preferably with a pin.
(4) If a seam has to be adjusted at one end to produce a tightening effect, take in the extra amount and pin on the right side. If a seam has to be loosened at one end, rip the seam at that part and repin as a lapped seam or a plain seam (with reduced seam allowance) using the pins applied on the right side.
(5) For side seam line that the slants towards the back as shown in the figure. Rip out the whole seam and repin alter raising the back part above the front the required amount.

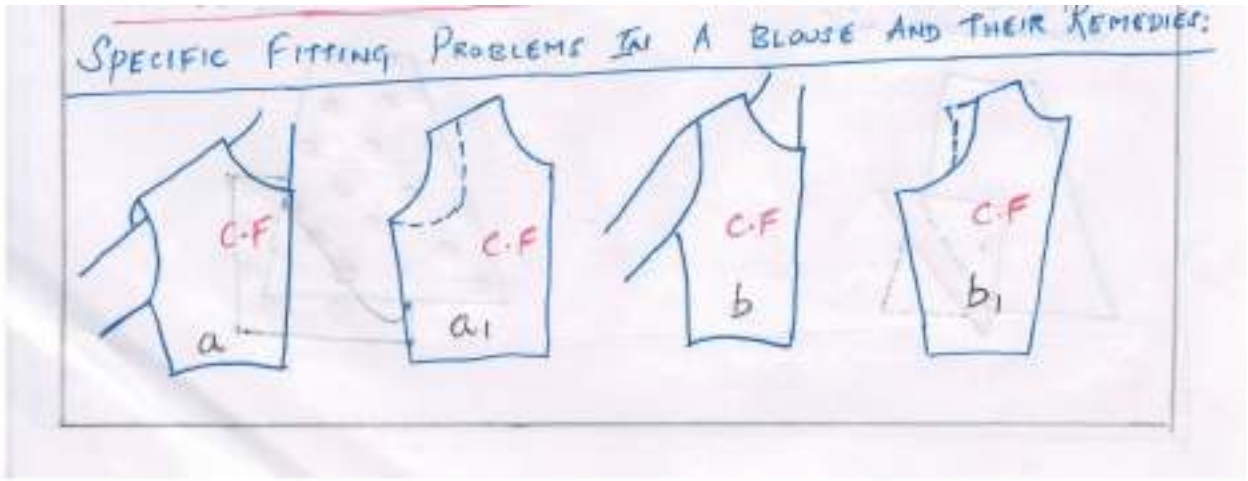
SPECIFIC FITTING PROBLEMS IN A BLOUSE AND THEIR REMEDIES:
We present below a number of fitting problems that you may encounter while fitting a blouse. The remedial measures for each problem are also explained with the help of the figures which are illustrated below. In these figures the solid lines indicate the original seam lines and the dotted lines the adjustments to be made. Since too many lines may confuse the reader, the cutting lines of blouse front, back and sleeve are not shown in the figures.

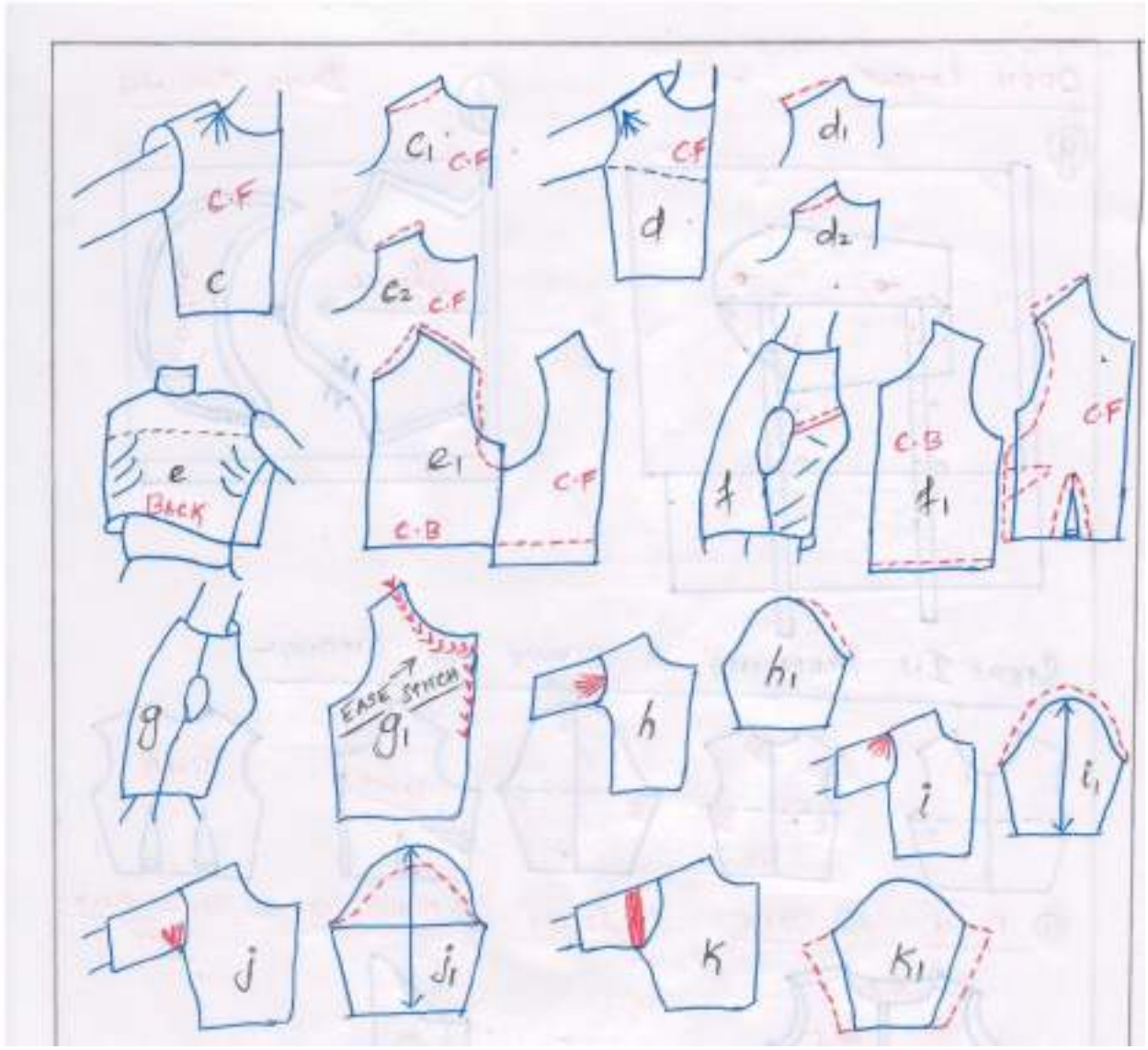
PROBLEM (i):
End of shoulder seam extends beyond the arm joint, the sleeve cap slips down below the arm joint (if sleeve has been attached)
CAUSE:
Shoulder seam is too long
REMEDY:
Shorten the shoulder seam. (Mark the correct length with pencil or chalk or pin and draw new armhole curve connecting this point and under arm joint as shown by the dotted lines).
PROBLEM (ii):
End of shoulder seam does not reach the arm joint. If sleeve has been attached, the sleeve cap rides up.
CAUSE:
Shoulder seam is too short
REMEDY:
Lengthen the shoulder seam (Mark the correct length and draw the new armhole curve as indicated by the dotted lines).
PROBLEM (iii):
(1) Diagonal wrinkles pointing towards the neck point of the shoulder.
(2) The blouse rises above the shoulder at the arm joint but hugs the neck.
(3) The crosswise grain line drops near armhole.
CAUSE:
Shoulder slope of the blouse is insufficient.
REMEDY:
Increase the shoulder slope. (Repin the shoulder seams making them slightly deeper as you approach the arm joint along the dotted line as shown in the figure. If the blouse is tight near the neckline, rip out the seam at this point and repin along the dotted line as shown
PROBLEM (iv):
(1) Diagonal wrinkles pointing towards the arm joint on shoulder.
(2) The blouse rises above the shoulder at the neck point but hugs the arm joint.
(3) The crosswise grain line pulls up at the armhole in front and back.
CAUSE:
Shoulder slope of the blouse is too much
REMEDY:
Reduce the shoulder slope. (This is can be done by reducing the seam allowance near the arm joint as shown or by increasing the seam allowance near the neck point.
PROBLEM (v):
(1) Wrinkles pointing towards the shoulder blades
(2) The blouse swings far out from the body at the back and hugs the body in front.
(3) The crosswise grain line curves up and the side seam slants towards the back

CAUSE:
Back length of blouse is insufficient due to the protruding shoulder blades.
REMEDY:
Provides the extra length for the shoulder blades (Rip out and pin new shoulder seam reducing the seam allowance of back shoulder. Rip out side seam and repin it lifting the back above the front at the side seam. Mark the new armhole seam line, increasing width of the back as shown. Front hemline near the waistline should be trimmed along the dotted line).

PROBLEM (vi):
(1) Wrinkles pointing towards the back
(2) The underarm seam slants to the front
(3) The blouse swings from the body at centre front and hugs the body at the back.
(4) The crosswise grain line rises above the bust line.
CAUSE:
Insufficient width or length or both for the blouse front.
REMEDY:
Provides the extra length and width near the bust line. (Rip out the side seam and introduce a side seam dart on the blouse front. If a side seam dart is already present, increase the width of the dart. Repin the side seam reducing the seam allowance on the blouse front. Increase the width of the waist line dart if necessary).
PROBLEM (vii):
The neckline gapes and sags in front.
CAUSE:
Neck circumference of the blouse is too much.
REMEDY:
Reduce the neck circumference. (Reshape the centre front line, slightly curving in towards the top edge near the neck as shown. If necessary, work a row of ease stitching (Large stitches) on the neck seam line and pull up the bobbin thread until the neckline fits smoothly.
PROBLEM (viii):
Pulling wrinkles pointing towards the front sleeve cap.
CAUSE:
Front sleeve cap seam is too deep.
REMEDY:
Reduce the depth of front sleeve cap seam as shown in the figure.
PROBLEM (ix) :
Pulling wrinkles pointing to the top of the sleeve.
CAUSE:
Sleeve cap height too short.
REMEDY:
Increase the sleeve cap height as shown by the dotted lines.
PROBLEM (x):
Pulling wrinkles pointing to under the arm point.
CAUSE:
Sleeve cap height is too much
REMEDY:
Reduce the sleeve cap height as shown.

PROBLEM (xi):
Sleeve pulls and wrinkles across the upper arm.
CAUSE:
Sleeve width is insufficient at the upper arm
REMEDY:
Increase the sleeve width at the upper arm as shown in the figure.


SPECIFIC FITTING PROBLEMS IN A BLOUSE AND THEIR REMEDIES:
C.F
a
C.F
a1
C.F
b
C.F
b1


C.F
c
c1 C.F
C.F
d
d1
d2
c2 C.F
e
BACK
e1
C.F
C.B
f
C.B
f1
C.F
g
EASE STITCH
g1
h
h1
i
i1
j
j1
k
k1

PATTERN ALTERATIONS:

IMPORTANCE OF ALTERING THE PATTERNS:

If a garment is cut after the pattern is altered to fit your figure, there is no dangerof wasting theexpensive fabric and spoiling the garment. Fitting the garments also will be much easier because there will not be major alterations to be made at this stage. Moreover some alterations cannot be satisfactorily made after the garment is cut. Hence it is essential that you perfect your pattern by making the necessary alterations before using it for cutting out the actual garment.

GENERAL PRINCIPLES FOR PATTERN ALTERATION:

As far as possible make changes within the pattern by slashing and spreading or slashing and lapping. Patterns can also be altered by redrawing the edges of the pattern. (This is the method adopted for altering garments at the time of fitting). But the first method is by far the best in altering paper patterns.

To preserve the original grain line, make all the slashes and folds parallel or perpendicular to the grain line (to the centre front, centre back line etc.,)

Where there are darts, make changes between the tip of the dart and the outside edge.

If an alteration in length is made along one edge of the pattern, take care to make an identical alteration in the adjoining edge. For example, if the back shoulder seam is shortened the front shoulder seam also be shortened.

When tucks or darts are used for making a pattern smaller, remember that the width of these should be just half the amount to be removed.

When decreasing or increasing the width of the pattern pieces, if only half the pattern (half back or half front) is used, subtract or add only one fourth of the total adjustment to be made. For example, if the waist measurement has to be increased by one inch, add ¼" to the half back pattern and the same amount to the front pattern. If only a front or back section needs adjustment to the respective section.

When the pattern alteration involves slashing and the spreading, it is necessary to keep a sheet of paper beneath and to pin and stick to it the spread-out parts so that they will thereafter remain in its position. On spreading or lapping after the slashing, some edges of the patterns become jagged. These must be trimmed after drawing the new seam lines.

COMMON PATTERN ALTERATIONS IN A BLOUSE:

You must analyse your fitting problems to decide whether which of the following alterations are needed in your blouse. All the principles of pattern alteration should be borne in mind while doing the alterations.

SHORTENING THE BLOUSE:

To shorten, make a tuck half as wide as the amount to be reduced and pin. The tuck should be made about 2.5 inches above the waist line at right angles to centre front or centre back line. Redraw the new straight side seam line, as shown in the figure.

LENGTHENING THE BLOUSE:

To lengthen, slash the pattern 2 ½ "above the waist line at right angles to centre front. Now spread the pattern the necessary amount and pin or stick the each edge to a strip kept underneath. Redraw the side seam line.

LENGTHENING THE SHOULDER SEAM:

Slash down from the midpoint of shoulder seam to a level below the armhole and then slash across at right angles to the first slash almost to the side seam. Now spread the slashed edges apart, the correct amount and stick or pin a paper underneath to maintain this position. Draw a new seam line from the neck line to the armhole.

SHORTENING THE SHOULDER SEAM:
Slash the pattern as above and overlap the edges of the slash, the necessary amount and pin. Draw the new shoulder seam line straight from the neckline to armhole.

DECREASING SHOULDER SLOPE:
Slash from the shoulder downwards as above then across through the side seam. Place paper below the slash and raise the entire armhole section the desired amount. Pin or stick the pattern to the paper. Draw new shoulder seam line as shown.

INCREASING THE SHOULDER SLOPE:
Slash the pattern as you did for decreasing the shoulder slope. Lower the entire armhole section, overlapping along the crosswise slash and pin. Draw new shoulder seam line as shown by the dotted lines.

INCREASING THE BACK LENGTH:
Slash the back pattern about 4" below the neckline, from the centre back to the armhole seam line. Spread the slash apart the necessary amount, insert paper underneath and pin in position. Redraw the centre back line straight, and neckline and shoulder seam to the original size as shown by the dotted lines.

DECREASING THE BACK LENGTH:
Slash the back pattern as above and overlap the edges of slash the necessary amount tapering to the armhole line. Redraw the centre back line and the other seam lines which got altered while overlapping the edges.

SHORTENING CENTRE FRONT LENGTH:
Slash the front portion across from the centre front to armhole about 4" below the neckline and lap the slashed edges as for the decreasing back length.

INCREASING LENGTH AND WIDTH OF THE FRONT PATTERN:
Make lengthwise and crosswise slashes cutting through the centre of dart. Spread the pattern the necessary amount in each direction (vertical and horizontal) and pin it to the paper. Mark the new dart point half way between the tips of the separated dart lines and redraw the wider darts.

DECREASING THE NECK LINE MEASUREMENT:
Pin the small even sized darts at regular intervals on the neck edge of the patterns.

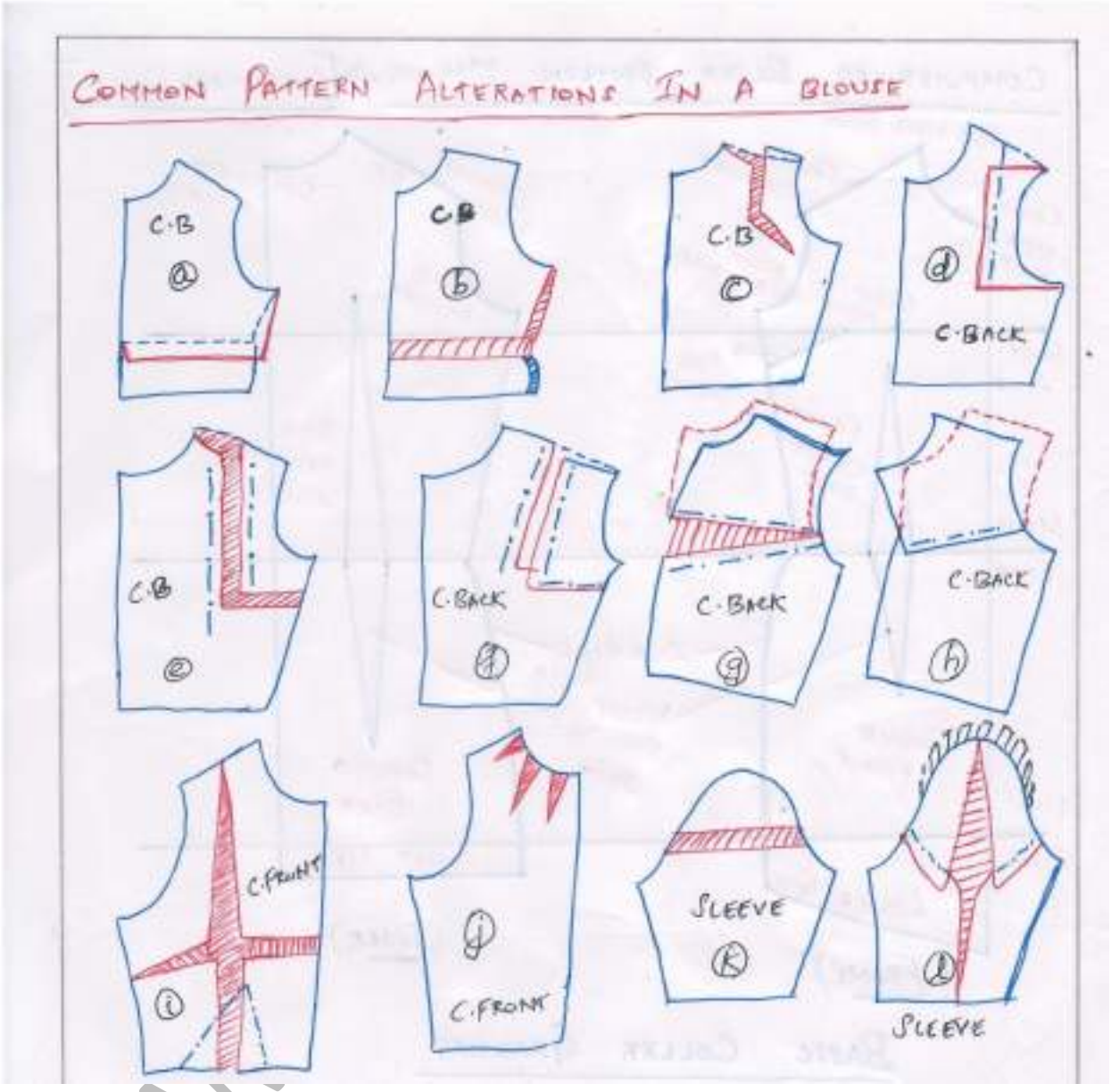
INCREASING THE WAIST MEASUREMENT:
Add to each side seam edge at the waist line one fourth the total amount of increase desired, and draw the new side seam lines.

DECREASING THE WAIST MEASUREMENT:
Remove one fourth the amount of decrease desired from each seam edge at the waist line, and draw the new side seam lines.

LENGTHENING THE SLEEVE CAP:
Slash the pattern crosswise as shown and spread the pattern the necessary amount.

INCREASING THE WIDTH OF SLEEVE CAP:
Slash the sleeve pattern vertically down from the centre of sleeve cap to the lower edge. Make a crosswise slash at the fullest part of sleeve cap from a seam line to seam line. Spread apart each side of the pattern, the necessary amount. This will cause the edges of the slash across the sleeve cap to overlap. Insert paper under slash extending beyond the sleeve cap line and pin or stick in position. Redraw the sleeve cap line to adjust for the amount decreased due to overlapping.

INCREASING OR DECREASING LENGTH OF SLEEVES:
To shorten or lengthen the short sleeves, alteration can be made at the lower edge.


COMMON PATTERN ALTERATIONS IN A BLOUSE
C.B
a
C.B
b
C.B
c
d
C.BACK
C.B
e
C.BACK
f
C.BACK
g
C.BACK
h
C.FRONT
i
j
C.FRONT
SLEEVE
k
l
SLEEVE

UNIT V

GRADING

Pattern grading is a technique used to increase or decrease the size of a garment pattern according to the measurements given in the size chart. It is the drafting process of enlarging or diminishing a style pattern into the patterns for other sizes. The function of grading is to see that this is accomplished with proper fir for the other size without changing the style sense of the original model. This can be done manually or digitally using the computerized pattern cutting software. These increments are referred to as garment grading rules. Each specific clothing market area and level has different grades rules. With the use of the pattern grading, it is possible to take one design and create alternate dimensions as the size of the dress changes. This allows the designers and sewers of apparel to create one middle size, usually of size twelve, and then grade up or down as necessary.

GRADING TERMINOLOGIES:

GRADE:

The grade of the pattern is the incremental increase or decrease in a pattern size at a given cardinal point. For example, a large majority of commercial patterns will have a two inch grade. This means that there is a difference of two inch difference between the sizes.

GRADING:

The process of increasing or decreasing the dimensions of the base pattern style.

CARDINAL POINTS:

The points on a pattern where it either increases or decreases for example, Neck, Shoulder, Armhole, Length, Girth etc.

BASE PATTERN:

The original pattern created (usually the middle of the size run). This is an industrial term. However, in the home setting, the base pattern would be whatever, patterns you are working with. For example, in the ITS, Insider Exclusive Library…….there are certain patterns that are only offered in 1 size, a size 6. This would be your base pattern.

TRUCING:

It is the process of smoothing and shaping the angular and curved lines on a seam to create a nice transition. Trucing includes checking to make a sure seam lengths match, corners are 90 degree angles where necessary, as well as folding darts to create the proper seam pattern shapes.

SIZE AND RUN:

The sizes included in a specific style for example, from S,M,L,XL or 4,6,8,10,12

CUT AND SPREAD:

The process of manually grading a sewing patterns by cutting the pattern apart and increasing or decreasing its size.

PATTERN SHIFTING:

The process of manually grading by shifting a pattern back and forth to increase or decrease its size.

SUPPRESSION GRADING:

This term is applied when the amount of suppression in a pattern is increased or decreased. Suppression is all forms of darts, pleats, seams and gathers which are used to control the shapes or contours. It is nothing to do with the styling. The suppression is to reduce the girth measurements in relation to another adjustment girth measurements.

BALANCE:

There are various interpretations of the balance, but it refers to the relationship between the front length from nape over the bust to waist and floor, and back length from nape to centre back waist to floor. It is also used as the general description, as the word suggests, for the lack of distortion.

NESTED (STACKED) GRADING:

This described the superimposing the one size on another so that the progression of increase is clearly visible.

GRADING TECHNIQUES:

In the apparel manufacturing industries the grading pattern is basically divided into two main categories. They are

1. Manual pattern grading or two dimensional grading
2. Computerized pattern grading or three dimensional grading.

MANUAL PATTERN GRADING:

The desired range of sizes is created, one by one, using a pattern template. Marks are made around the master pattern at the appropriate distances and the marks are later joined up to form the enlarged patterns. There are two basic methods of pattern grading involved here they are :

1. Cut and Spread 2. Pattern shifting.

(a) **CUT AND SPREAD:**

These starts by the use of tracing and marking techniques from the original pattern to a white paper. Ensure that all the mark lines like grain, darts lines are visible here. In this method the original patterns are cut into three parts and spread the cutting pieces by a specific amount to grade up. Then overlap them to grade down. To do this process, only scissors, pencil, measurement tape and rulers is required. This is an earliest method which acts as a base for the other two methods. To perform this method, you must cut the pattern and spread the pieces by a certain amount to grade up or overlap the pieces to grade down.

(b) **PATTERN SHIFTING**:

It is the another process of pattern grading. When a fashion designer or pattern master wants to increase or decrease the overall dimensions of a pattern to get the different sizes is called as pattern shifting. To make the pattern larger, transfer the original pattern into another sheet of paper. To make the pattern smaller, they will have to trim the edges to the desired dimensions. It is done by moving the master pattern a certain measured distance up and down and left and right using a special designed ruler. To get the same result as the cut and spread method, the designer redraw its outlines.

COMPUTERIZED GRADING TECHNOLOGY:

Computed grading (CAD) is the fastest pattern techniques. But when it first came, it was only used by the larger fashion or apparel manufacturers for their production process. Now CAD is more affordable software. By this method, every manufacturers get more accurate, precise detailed patterns in a short time. It is the most recent development in the grading technology. Ti is also the fastest method. Computer grading, however, it is usually expensive and only larger manufacturers can afford it. Computer grading takes the processes of two former methods and digitizes them. There is not a superior method; they are equally capable of producing a correct garment grade.

Computer based grading systems operate in one of the two ways:

1. The grading increments are feed into the computer and the different sizes are generated automatically using the same methods as applied for the manual grading.
2. The pattern for each individual size is calculated separately starting from the data in the size specification charts.

The resulting nest of the patterns can be displayed to scale on the computer monitor for visual assessment and if necessary, adjustment. Once the pattern set has been generated on the computer, it may be used in the various ways, depending on the level of the automation in the factory. In a fully automated system, the garment parts will be stored automatically and arranged in a lay plan which can then be transmitted in the form of a control program to the automatic laying and cutting system. Alternatively, the patterns can be sent to a large plotting device where they will be drawn at full scale to serve as the paper patterns for manual cutting. The patterns can also be used in an automatic device for cutting templates from more durable materials.

Computer pattern grading can be an integral part of sizing technology as long as the actual grading system used is correct. The computer cannot make a good grading system out of bad one but can, if properly used, complement and enhance an accurate and efficient system.

PRINCIPLES OF COMPUTER GRADING:

The computer constructs the diagrams by using mathematical coordinates which can be recorded by placing the pattern on the digitizer which works as an electric grid and it records the special points around the shape by means of a cursor.

The centre of cross hairs of the cursor is placed on the points to be recorded.

When the cursor button is pressed, signals are sent to the computer which is then translated to the numerical record of the shape and information for the piece

Once a basic shape, its significant features and grading information is stored in the computer memory.

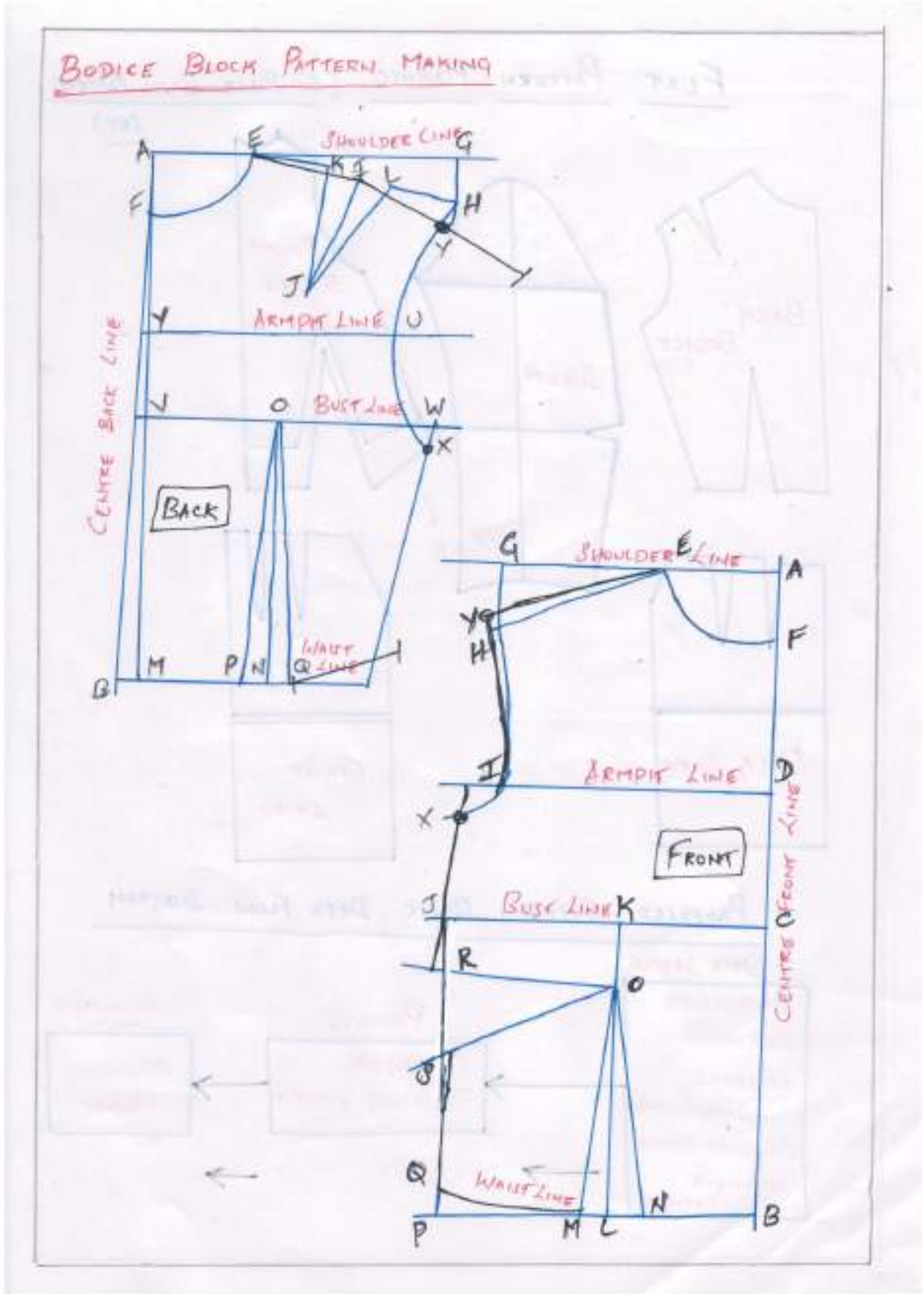
Then the range of sizes can be graded and plotted out onto the paper pattern or used to construct lay plans for the production markers.

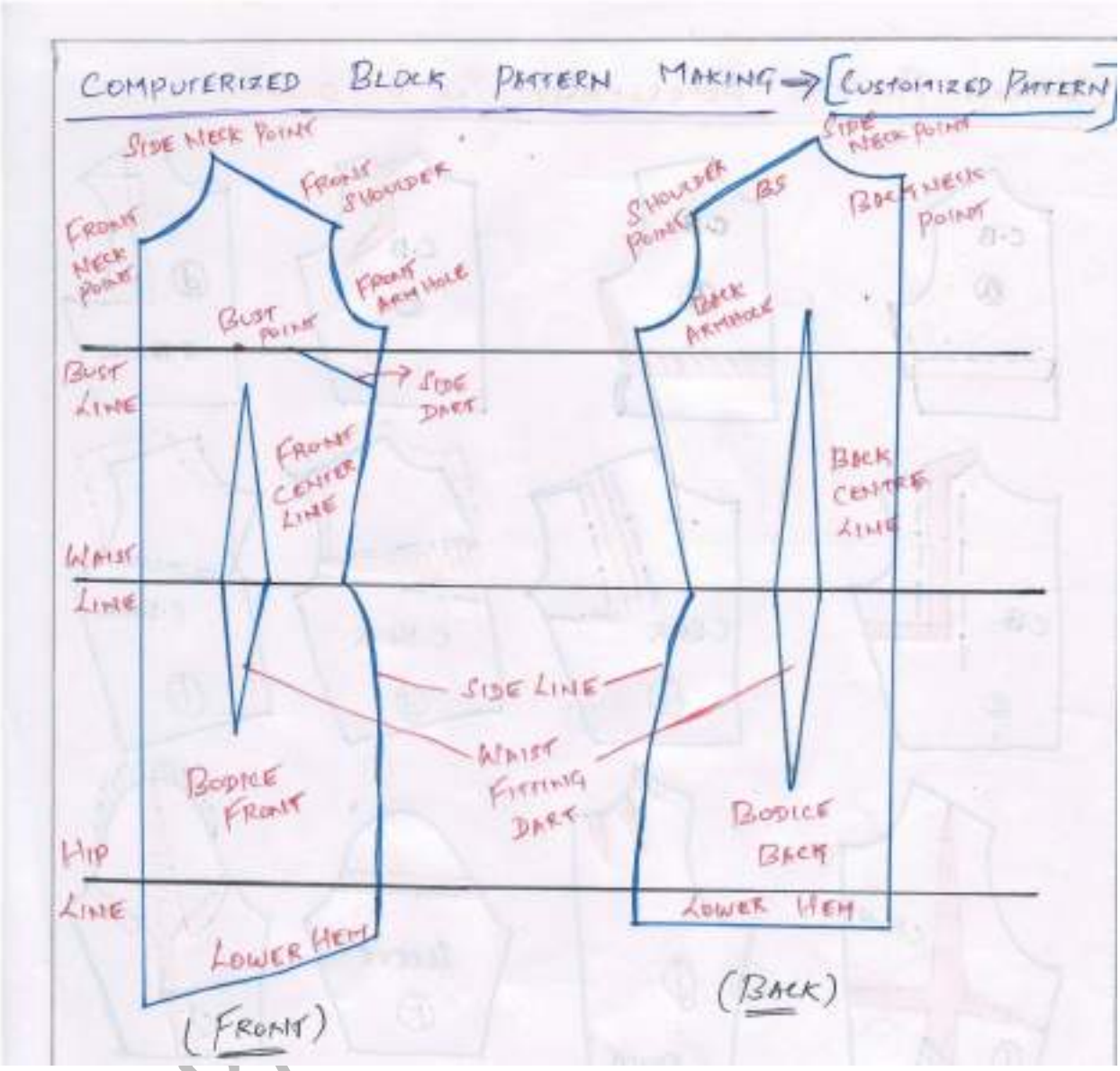
ADVANTAGES:

- Quick processes (i.e.)., less time consumption
- High accuracy may be obtained

DISADVANTAGES:

- High initial cost is involved
- Skilled operator is required.


BODICE BLOCK PATTERN MAKING
SHOULDER LINE
ARMPIT LINE
BUST LINE
WAIST LINE
CENTRE BACK LINE
BACK
SHOULDER LINE
ARMPIT LINE
BUST LINE
WAIST LINE
CENTRE OF FRONT LINE
FRONT



GRADING THE BODICE PATTERN:

Grading is the method of enlarging or reducing a pattern of a particular size proportionately to some other size. Starting from a pattern drafted to a particular size, you can see patterns of other
sizes(for the some other type of figure) by grading. Commercial patterns come in the bust sizes 32",34",36"etc (successive ones differing by 2" in size). To illustrate the grading procedure, it will be supposed that 32" size pattern is available and that using it as a basis, patterns of sizes 34", 36",38" and 40" are to be prepared. Note first of all that for a 2" increase in bust size, the increase needed in the girth or width measurement on the half pattern is one-fourth of this. i.e., ½". For a proportionate increase-in overall size, the pattern has to be also lengthened (by ½". At shoulder level and the same at the centre back). Further, for each size increase, both the neck and shoulders have to be widened by 1/8" and the armhole by 1/4". These general observations must be kept in mind when you go through the detailed procedures given below.

GRADING THE BACK BODICE:

Take the 32" size back bodice pattern (without seam allowance) and trace its outline on a larger sheet of paper. Extend the centre back line A1, A by one inch and mark the four points at ¼" intervals. (these represent bust sizes 32" to 40" at 2" intervals. Label the last points as A2. Mark C one inch vertically above B. Mark CD= ½" and connect DB. Divide DB into 4 equal parts, then connect these points to the points marked above the centre back line as shown. Now draw DF parallel to the shoulder line BE, with DF=BE+1". This will be the shoulder line for 40" size. Connect F to the original shoulder point E. Mark the three points which divide EF into four equal parts, and join them to the corresponding points on BD by lines which will be parallel to DF. Next, draw the horizontal line LM from the underarm point and mark P as the midpoint of AL. Draw PQ as shown. Extend this line one inch outward and mark 4 points ¼ " apart. and

Now extend the bust line LM and waist line A1R and mark points ½ " apart. Connect all the points marked as shown in the figure.

GRADING THE FRONT BODICE:

When grading the front bodice, the bust line is extended to both sides (beyond the centre front and beyond centre side seam). 3/8" is added beyond the centre front and 1/8" beyond the side seam for each side increase. There is no grading around the armhole. The shoulder lengths 1/8" and rises ½ " for each size increase. The neck grade rises 1/8" and extend 3/8" outward on the centre front.

Take the 32" size front bodice pattern and trace its outline on a larger sheet of paper. Extend the waist line AB beyond B and mark the four points 3/8" apart. Label the last point as C. Similarly extend the bust line LM to LN and mark the points 3/8" apart on MN. Connect CN and corresponding points and extend these four lines upwards as shown. These are the centre front lines of the various sizes.

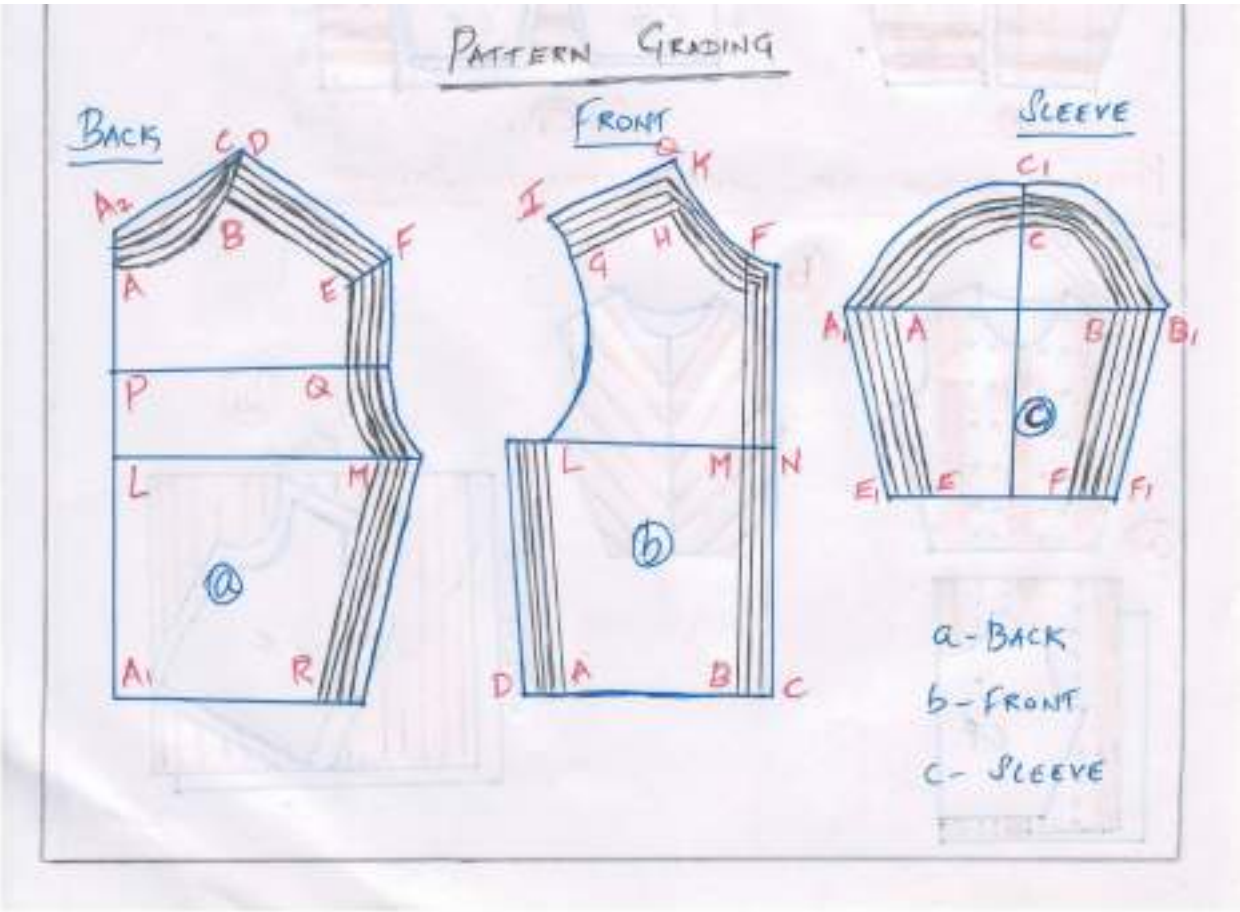
Extend the line BA beyond A and mark the four points 1/8" apart. Label the last point as D. Similarly extend the line ML and mark four points 1/8 " apart. Connect all the corresponding points to form the side seam lines of the various sizes.

On the shoulder line, rule vertical lines upwards from G and H and mark off four points at ¼ " intervals along each of these lines. Label the highest points as P and Q respectively. Connect PQ and extend it on to either side by ½ " and mark the points I and K. IK is the shoulder line of the size 40. Connect GI and HK as shown. This gives the angle for shoulder increase. Rule the shoulder lines for the in between sizes by connecting the points marked earlier and extending them on to either side as shown.

Extend the centre front line upwards and mark off four points 1/8" apart. Label the highest point as F and connect KF as shown. Connect the corresponding points to form the neck lines extend the lines to meet the centre front lines.

GRADING THE SLEEVES:

Take the sleeve pattern of bust size 32" and trace its outline on a sheet of paper. Extend the line AB one inch beyond B to B1, and one inch beyond A to A1, between AA1 and BB1, mark the points at ¼ inch intervals. Extend the centre line one inch beyond C to C1. On CC1, mark the points ¼ inch apart. Extend the line EF one inch beyond F to F1, and one inch beyond E to E1. Between EE1 and FF1, also mark the points ¼ inch apart. Now connect the respective points as shown in the figure. The outer most pattern is that of 40 inch size, next one 38 size, next 36 inch size and so on.



GRADING THE COLLARS:

Collars are the important part of the garment because they serve as the frame of your face. Since we tend focus on the face, the styling and application of the collar is important for your looks and the look of your garment.

PROCEDURE FOR GRADING: (STANDARD- FLAT ROLL):

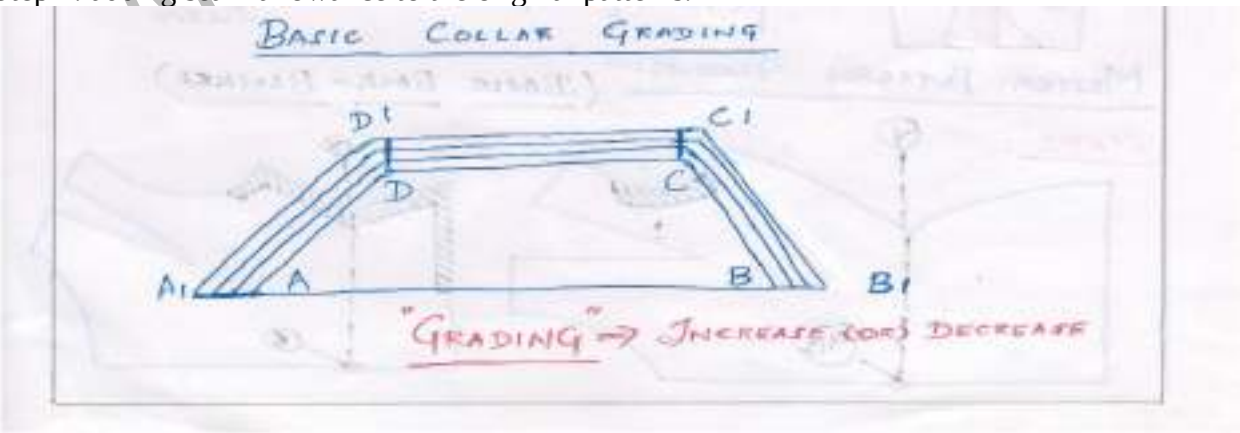
When cutting, check it to see if the upper collar is larger than the under collar. It should be ¼ inch larger for the bulkier fabrics, and 1/8 inch larger for medium to lightweight fabrics.

Step 1 : choose your bodice block base

Step 2: tracking off the original pattern pieces

Step 3: decide the style line of the available collar types.

Step 4: adding seam allowance to the original patterns.



MANUAL GRADING OF BASIC COLLAR PATTERN:

Take the collar pattern of bust size 32 inch and trace its outline on a sheet of paper. Extend the line A to A1, B to B1,C to C1 and D to D1 as shown in the figure. Between A A1,B B1,C C1,D D1, mark the points at ¼ inch intervals. Then connect the respective points as shown in the figure. The outermost pattern is that of 40 inch size, next one is 38 inch size, next is 36 inch size and so on.

MASTER PATTERN GRADING:

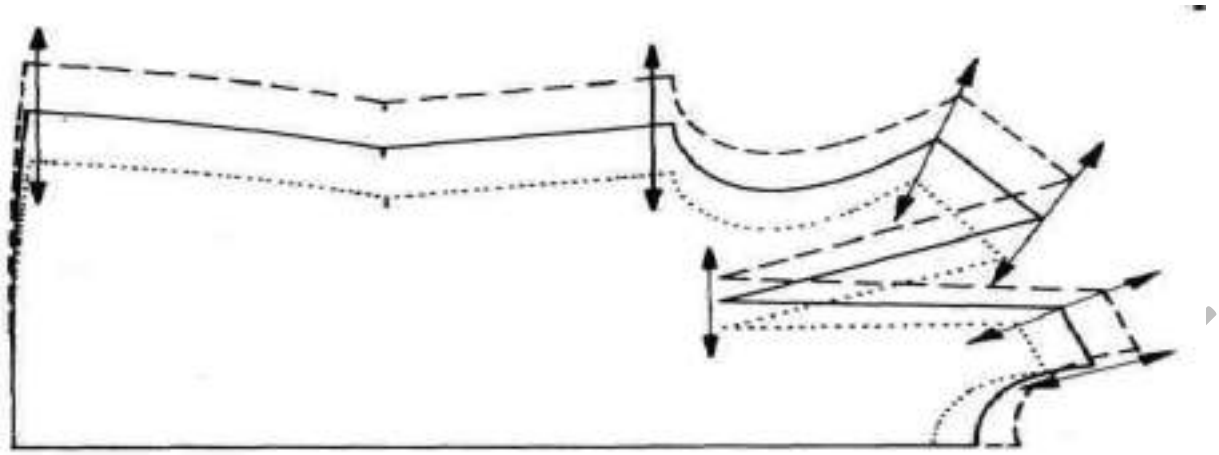
The following examples demonstrate the application of the system to the standard type of the block patterns. These are the basic patterns from which most the outerwear garment patterns developed and each examples provides:

- Where necessary, an illustrated introduction to the principles involved in grading the demonstrated patterns.
- The increments used and their location.
- The net of grading increments required for one size up and one size down from the basic size.
- Instructions regarding the common and the other axes required in relation to the grading position of the pattern.
- Grading instructions accompanied by the illustrations showing each successive stage. The line sectors to mark after each move denoted by a thickened line.
- An example of the finished grade is shown together with the vectors used for the checking accuracy.
- The first five groups of examples shows the application of the dynamic neck to waist grading method and in group six, the static method is demonstrated.

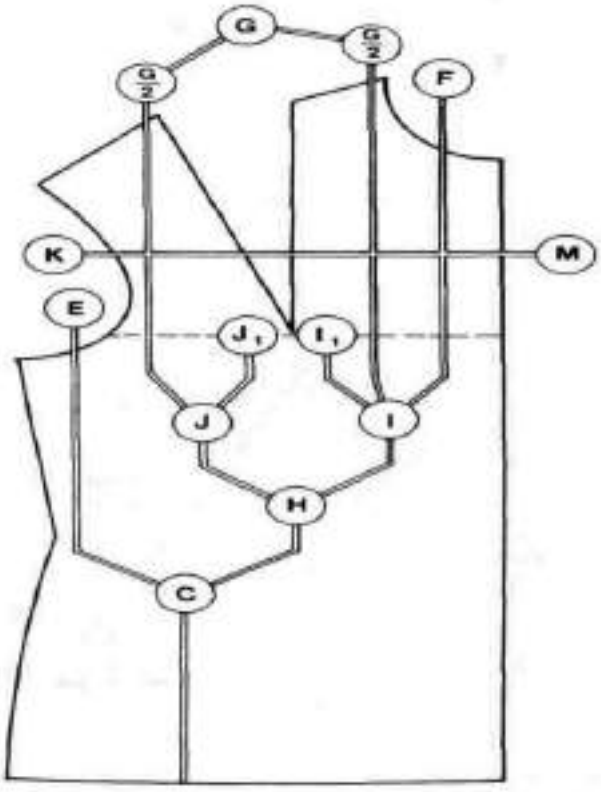
FRONT GRADING:

This is the basic grading for all the fronts with bust darts and the example is demonstrated on the standard block front with the bust dart coming from the shoulder. The increments used for this grade are as follows:

C: the total grade from the front edge to the side seam.
E: side section.
F: neck width.
G: shoulder length in two sections (G/2+ G/2)
H: width of breast.
I: front edge to bust point on bust line
I: first side of the bust point.
J: bust point to armhole on the bust line.
L: second side of the bust point.
M: front neck point to bust line.

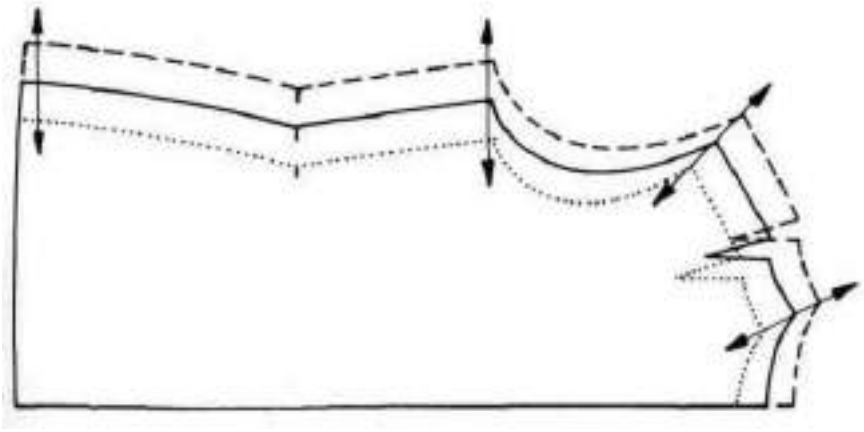


INCREMENTAL DIAGRAM:



BACK GRADING:

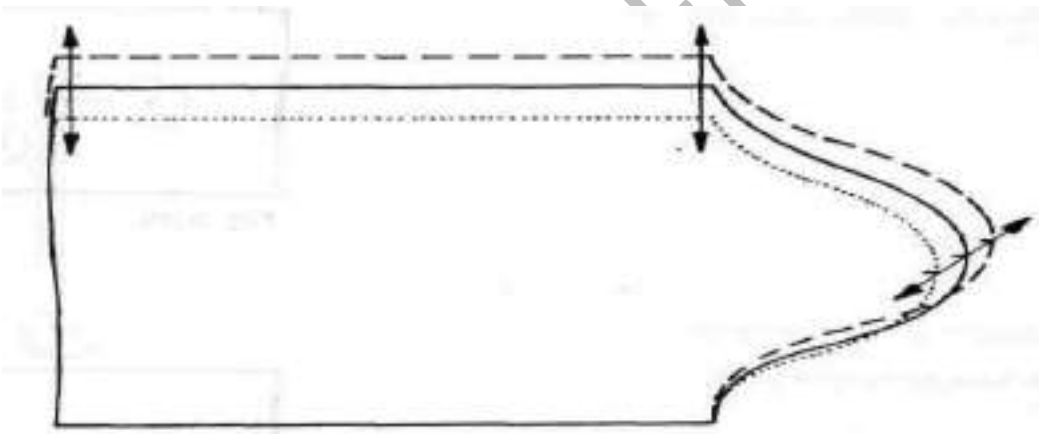
This first grading example utilizes the following increments.
B: the total width grade from the centre back to the side seam.
D: across back. This is equal to increments F plus G.
E: side section.
F: neck width.
G: shoulder length in two sections (G/2+G/2).
K: armhole depth.



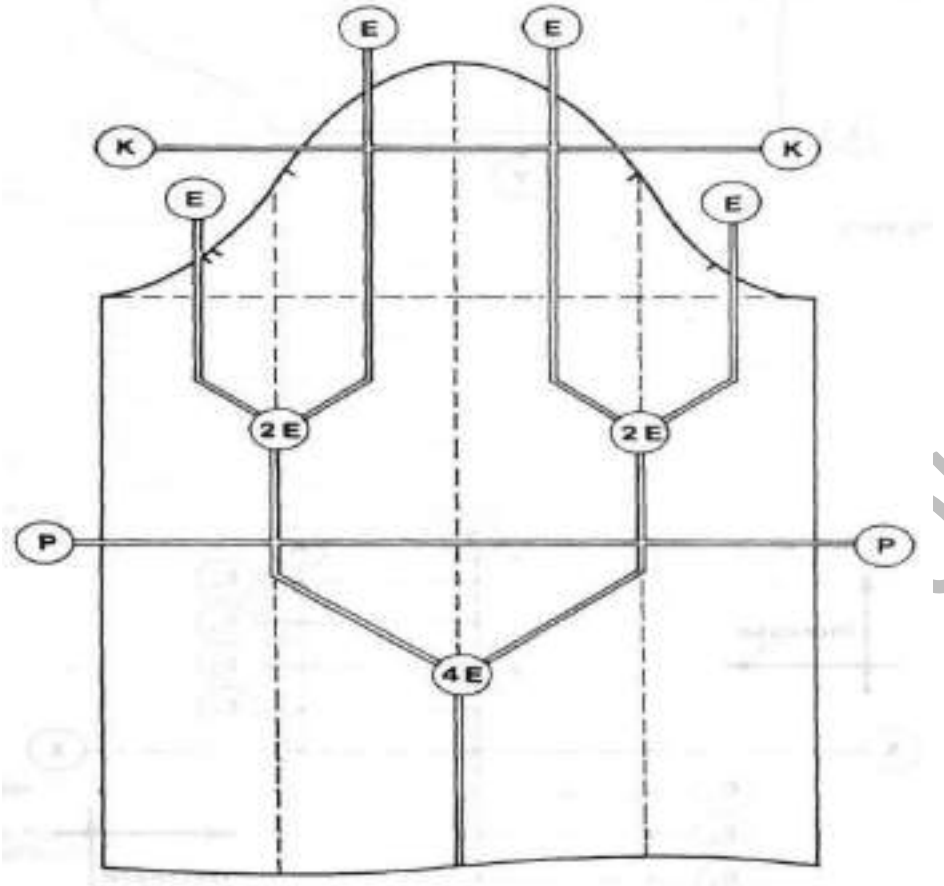
BASIC SLEEVE GRADING:

The one-piece straight sleeve is the first of the basic derived grades where all of the necessary grading increments are obtained from the armhole and side section grade of the body.

1) That between the top and bottom halves of the sleeve.
2) That between the two halves of the front and back sleeves

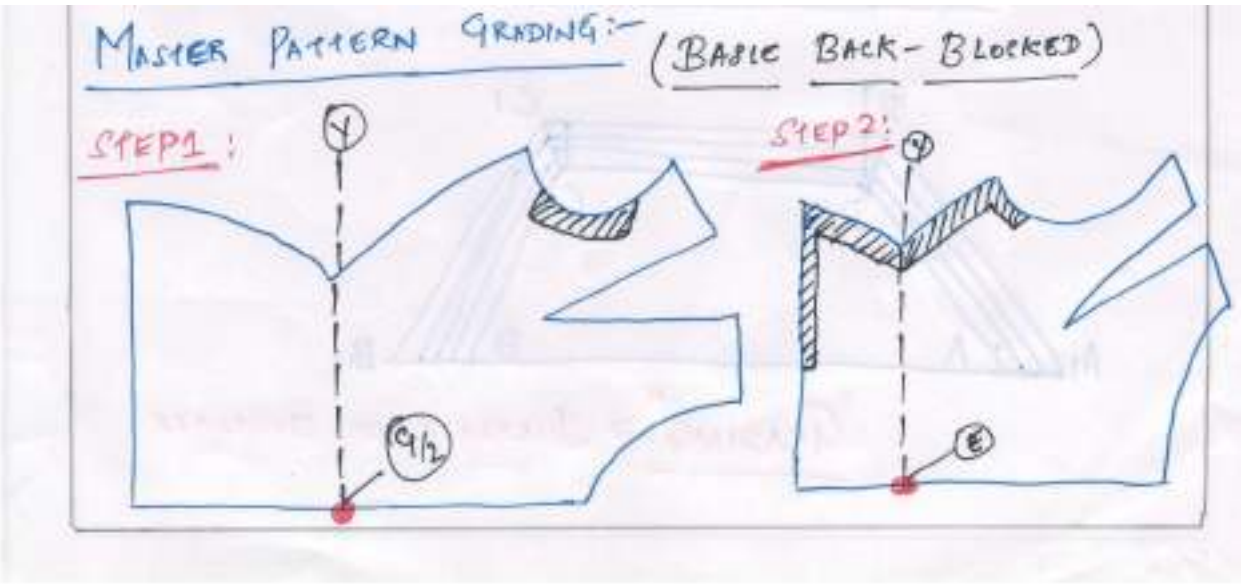


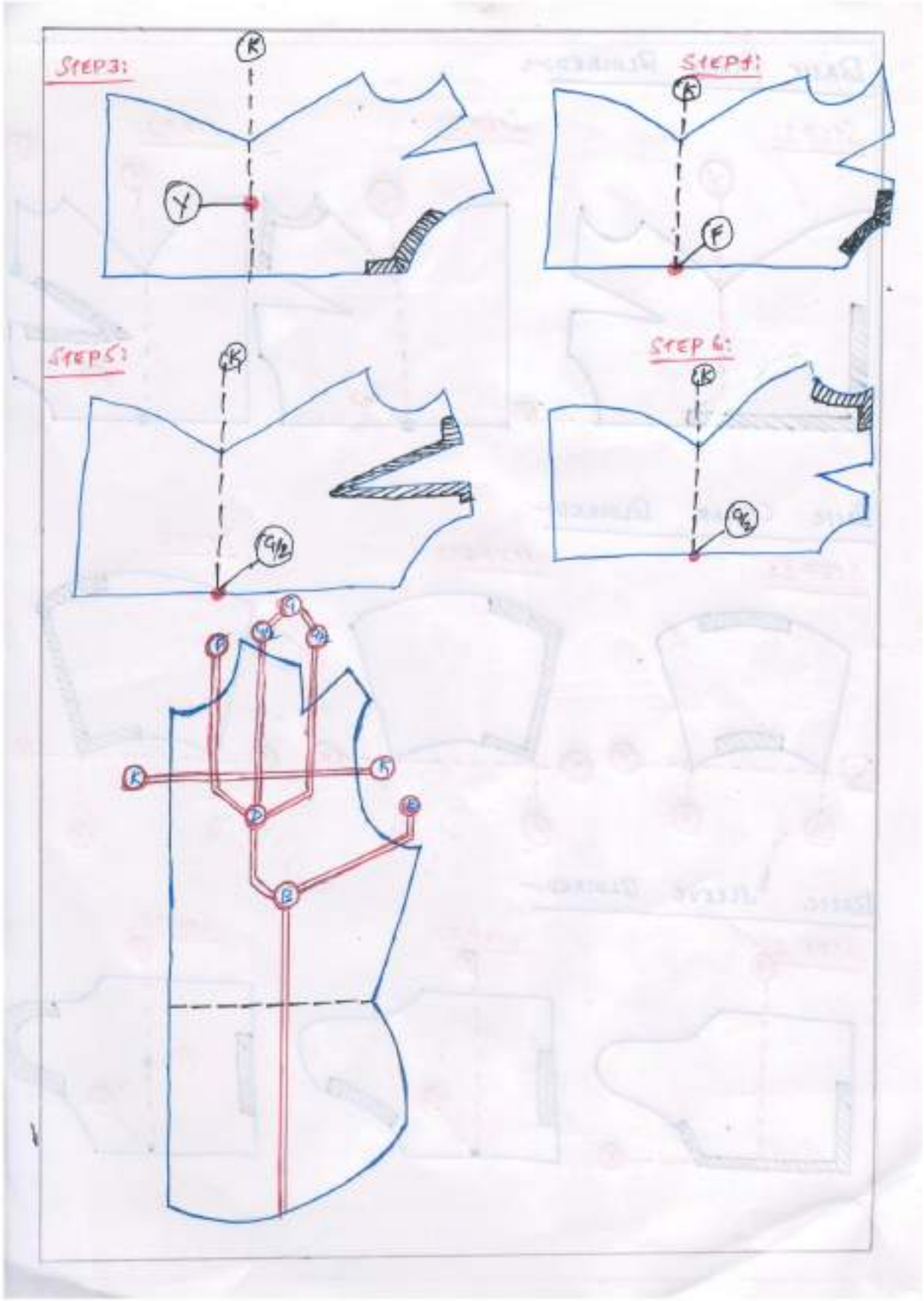
INCREMENTAL DIAGRAM:

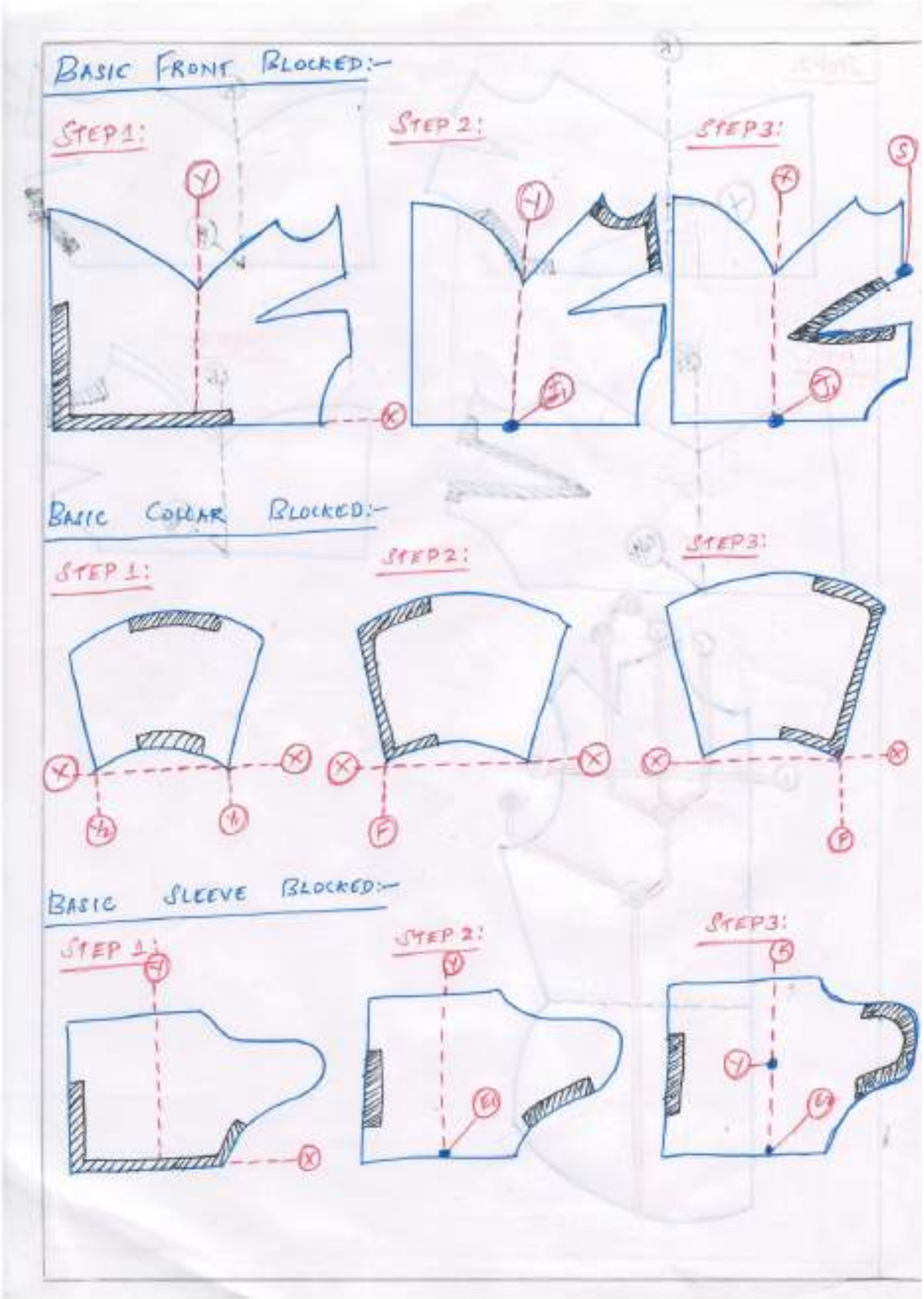


BASIC COLLAR GRADING:

The grading increments for these components are derived directly from the back and front neck base sections of the body. Thus for each size, the length of the basic collar changes by the amount of 2F. The X-axis for this grade comes under the constructions systems generally used for this type of collar and this method ensures that the neck seam curvature remains unchanged throughout the grading. This is an important principle because the distance Z controls the stand and fall of a collar.




STEP 3:
K
Y
STEP 4:
K
F
STEP 5:
K
C 1/2
STEP 6:
K
C 1/2


BASIC FRONT BLOCKED:-
STEP 1:
STEP 2:
STEP 3:
BASIC COLLAR BLOCKED:-
STEP 1:
STEP 2:
STEP 3:
BASIC SLEEVE BLOCKED:-
STEP 1:
STEP 2:
STEP 3:

INFORMATION FLOW:

Computerized grading technology have started in 1964 by Dr. H.J.Gerber. By 1968, Computerized pattern grading and marker planning systems had become commercially available since then it has become a basic tool for clothing industries throughout the world. Computerized pattern grading is, in effect, graphic data processing applied to the pattern grading and like all data processing requires the most important three steps

Step 1 : DATA COLLECTION
Step 2: DATA PROCESSING
Step 3: DATA PRESENTATION

DATA COLLECTION:

This starts at the same point as manual grading with the finished master pattern of the garment to be graded. The master pattern is converted, via the digitizing process, to a format of numbers to which the computers can recognize and process. At this stage, there is also the input of alphanumeric data which includes the following:

1. the range axamnd intervals of the sizes required.
2. the grade points of the pattern components
3. the grade rules which are to be applied to these points.
4. the output form required. (i.e.)., a drawing or a cut-out patterns.

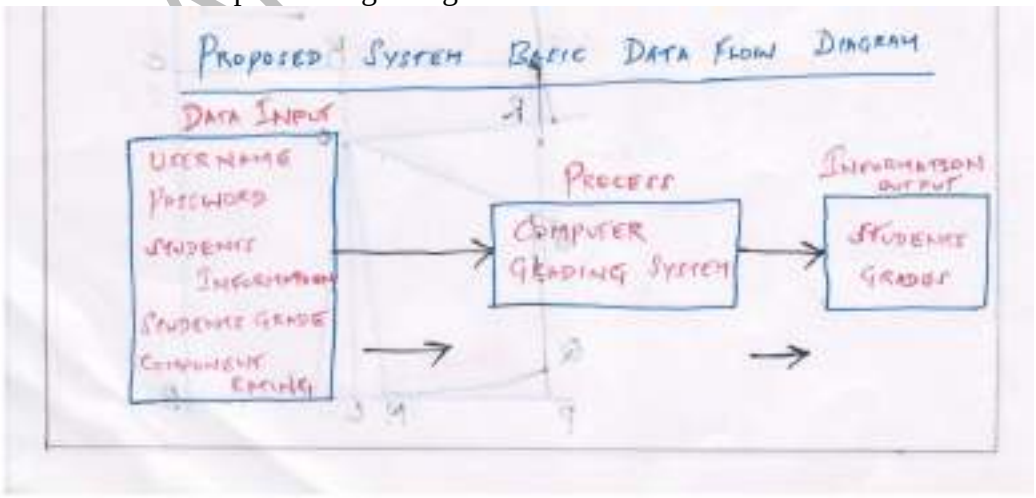
During this input process, the computer must be instructed in precise terms, what is expected to accomplish. Thus, the generally allowable imprecisions of manual grading are eliminated and are replaced by defined commands.

DATA PROCESSING:

This is where all of the routing and unique manual grading procedures are carried out by the system. Many manual grading techniques which require great skill and craftsmanship on the part of the pattern grader become simple and direct when performed by the automation.

DATA PRESENTATION:

The principal output at this stage is the graded patterns and these are drawn out by the plotter according to the requirements. The graded components can be presented as the individual components or nested in full size or miniature scale. Alternatively, the patterns can be out, notched, and annotated in paper pattern, in full sized or miniature scales. Operational data is also generated at this phase via the line pattern which provides the hard copy reports and statistics for the records and management information. These three forgoing stages convert the master pattern into a set of graded patterns which can be used to plan the cutting markers for manual or computerized grading.



SYSTEM DESCRIPTION OF COMPUTER GRADING:

The proposed system is developed using VBA Excel. It improves the working methods by replacing the activities done manually with the computer-based system. By automating every activity of the manual system being employed by the school, work becomes easier and grades are computed in less time accurately. The proposed system is simple, interactive and has a very user friendly interface such that even those with the little or no knowledge about working with computers can easily operate it. A welcome screen starts the program and the teachers log-in by entering their username and password.

SYSTEM SPECIFICATION:

The proposed system is composed of three main modules; namely the registration module where the pertinent student information are entered, the subject module, where the teacher enters the rating of the student for each grade component and the grade computation module, where the grade of students is calculated based on the inputted ratings for each grade component. After the teacher logs-in, the main menu is displayed containing the three options namely, to enter the student information, to enter the student grades, or to view the student information.

The process begins with the entry of student information(Module 1). This is where the pertinent student data such as the students name, address, parents name, contact number etc., are entered and stored in a student information database. Using the data from the student information database, the teacher chooses a subject and enters the rating of the student in each grade component(Module 2). The grades are stored in the subjects database. The grades stored in the subjects database are then retrieved and used in the computing for the grade of the students (Module 3).

The current system being implemented by Metropolitan Academy of Manila is the traditional method of recording, calculating and maintaining the students grades and records. Everything is done manually. Studentsinformation is written on paper forms during the enrolment. The registrar prepares a list of official enrolled students and gives copies to the principal and to the teachers. The teachers writes down the name of the students in their class records for every subject and the section he or she is handling and enters the rating of the students for every grade component. The teachers manually compute the grade of the students using a calculator and submit their class records to the principal for checking.

The principal checks the grades one by one and if errors are found, the class record is returned to the teacher, who re-computes the grade and submit it again to the principal for checking. Correct and verified grades are then given back to the teachers to be submitted to the Registrar who prepares the students report cards.

This type of system is very tedious and takes long time. Manually calculating, checking and re-computing the grades of the students are very difficult and are very prone to human errors. Added to this is the money being spent by the school for the paper files and forms, cabinets and other things needed to store the student data and records.