MODULE 2

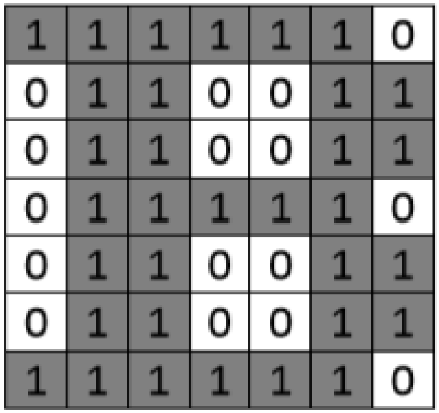
Graphics Primitives

Character generation methods

- We can generate characters and numbers in a variety of sizes and styles on the screen.
- The overall design styles of a set of characters is called typeface.
- There are 2 different representations are used for storing computer fonts.
  - Bitmap method/dot matrix
  - Stroke method

Bitmap method

- A simple method for representing the character shapes in a particular typeface is to use rectangular grid patterns.
- Figure below shows pattern for particular letter.



1	1	1	1	1	1	0
0	1	1	0	0	1	1
0	1	1	0	0	1	1
0	1	1	1	1	1	0
0	1	1	0	0	1	1
0	1	1	0	0	1	1
1	1	1	1	1	1	0

Fig. 2.25: - Grid pattern for letter B.

- When the pattern in figure 2.25 is copied to the area of frame buffer, the 1 bits designate which pixel positions are to be displayed on the monitor.
- Bitmap fonts are the simplest to define and display as character grid only need to be mapped to a frame-buffer position.
- Bitmap fonts require more space because each variation (size and format) must be stored in a font cache.
- It is possible to generate different size and other variation from one set but this usually does not produce good result.

Stroke method

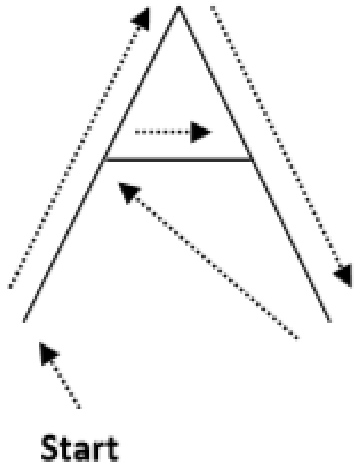


Fig. 2.27: - Stroke Method for Letter A.

- It uses small line segments to generate a character.
- The small series of line segments are drawn like a stroke of a pen to form a character as shown in figure.
- We can generate our own stroke method by calling line drawing algorithm.
- Here it is necessary to decide which line segments are needs for each character and then draw that line to display character.
- It support scaling by changing length of line segment.

Bitmap v/s Stroke method

Bitmap method

- More memory space needed to store pixel values.
- Simple to define, map pixel values to the rectangle grid.
- Does not produce good result always.

Stroke method

- Less memory space is needed to draw line segments.
- Scan line polygon fill algorithm is used to fill different shapes of characters.
- Produce good result always

Outline Font

- In this method character is generated using curve section and straight line as combine assembly.
- Figure below shows how it is generated.

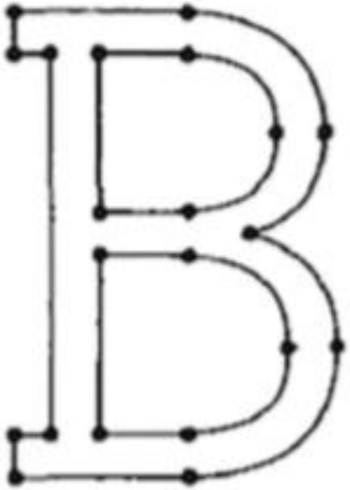


Fig. 2.26: - outline for letter B.

- To display the character shown in figure 2.26 we need to fill interior region of the character.
- This method requires less storage since each variation does not required a distinct font cache.
- We can produce boldface, italic, or different sizes by manipulating the curve definitions for the character outlines.
- But this will take more time to process the outline fonts, because they must be scan converted into the frame buffer.