MA144: Problem Solving and Computer Programming

Lecture-5

Flowchart

Flowchart

Flowchart:

- A flowchart is a picture (graphical representation) of the problem solving process (or an algorithm).
- It gives a step-by-step procedure for solution of a problem.

Elements of a flowchart:

- Various geometrical shaped boxes represent the steps of the solution.
- The boxes are connected by directional arrows to show the flow of the solution.

Uses of a flowchart:

- To specify the method of solving a problem.
- To plan the sequence of a computer program.
- Communicate ideas, solutions.

Drawing a Flowchart

- **Identify** input and output.
- **Apply** reasoning skills to solve the problem.
- **Draw** the flowchart using the appropriate symbols and arrows to show the sequence of steps from top to bottom, in solving the problem.

Flowchart Symbols

Oval: indicates start or end of the program or algorithm (**terminal**)

Parallelogram: denotes input or output of data (**input/output**)

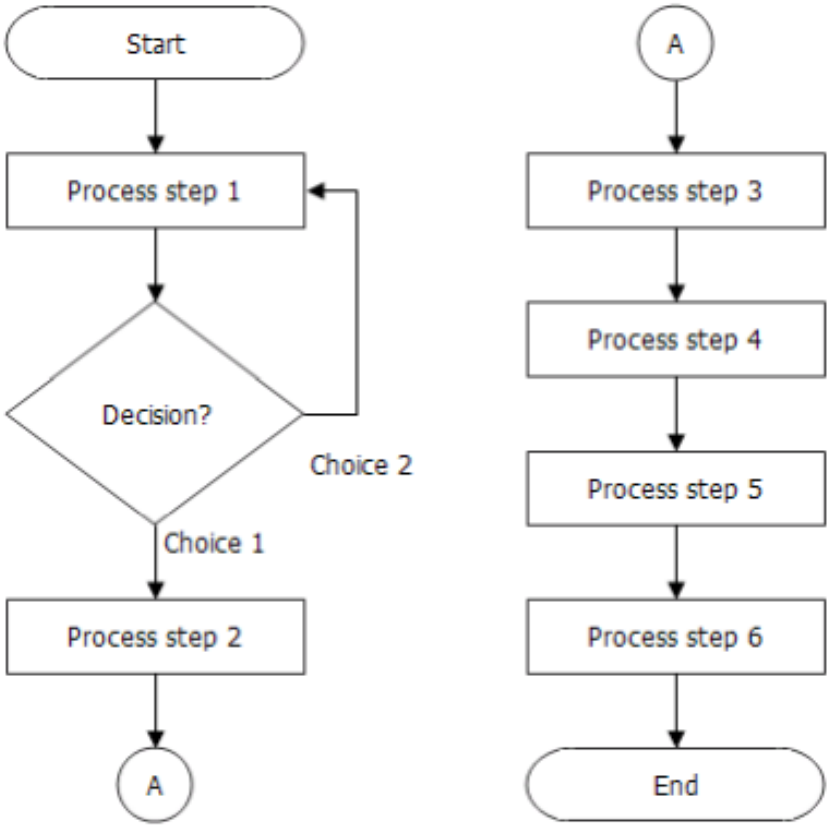
Rectangle: Any type of internal operation, like data transformation, data movement, logic operation, etc. (**process**)

Diamond: evaluates a condition or statement and branches depending on whether the evaluation is true or false (**decision**)

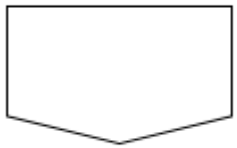
Arrows: indicate the direction of the progression of the program (**flow lines**)

Flowchart Symbols (contd…)

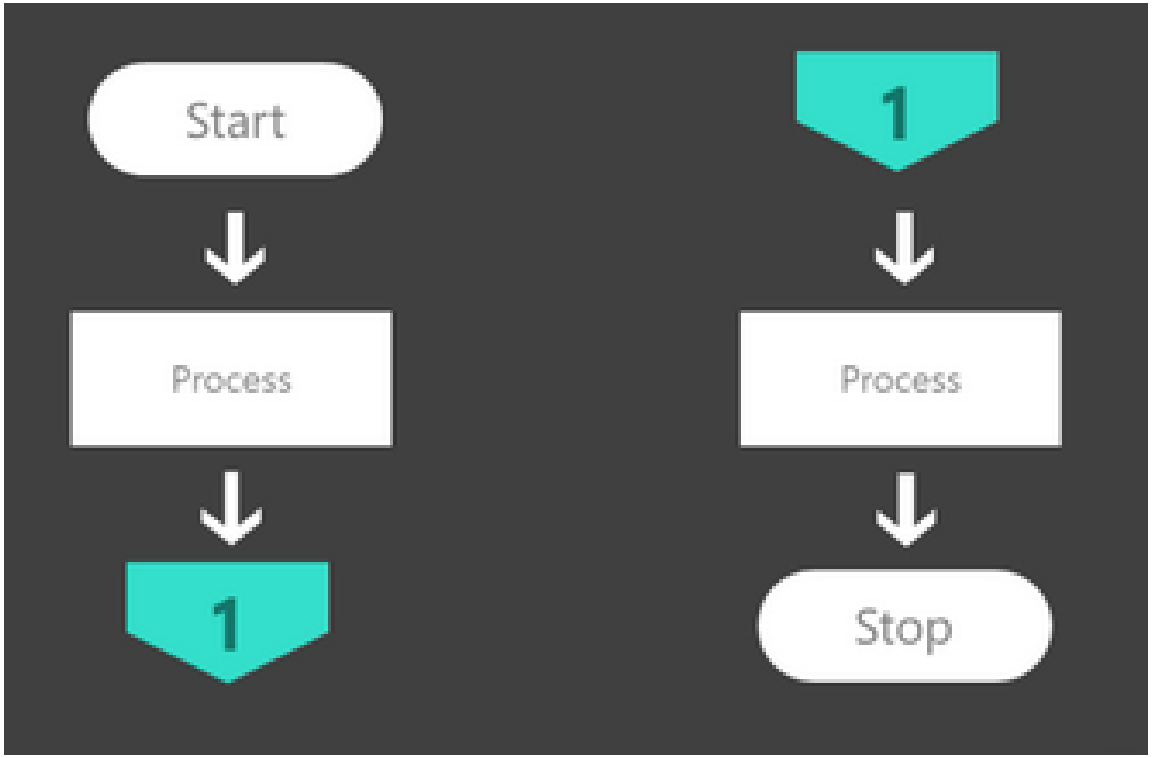
Circle: provides continuation of logical path at another point in the same page (**on-page connector**)



Flowchart Symbols (contd…)



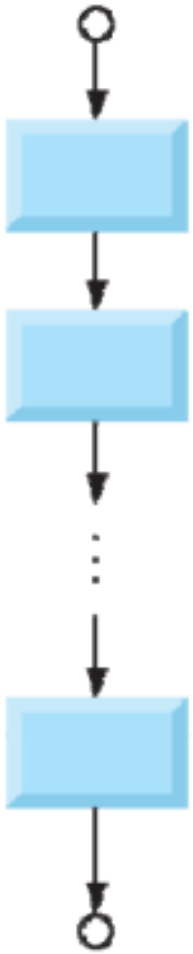
indicates continuation of a logical path on another page (**off-page connector**)

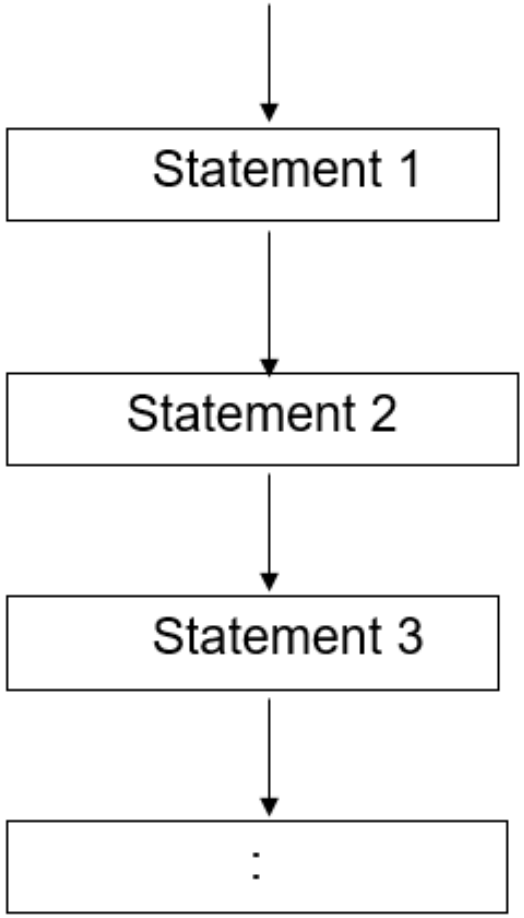


Two different pages

Flowchart Constructs

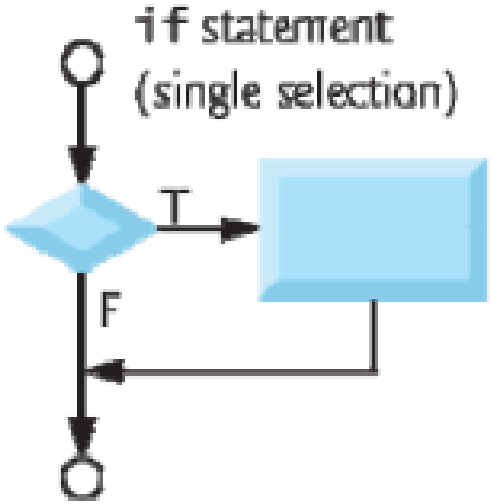
Sequence

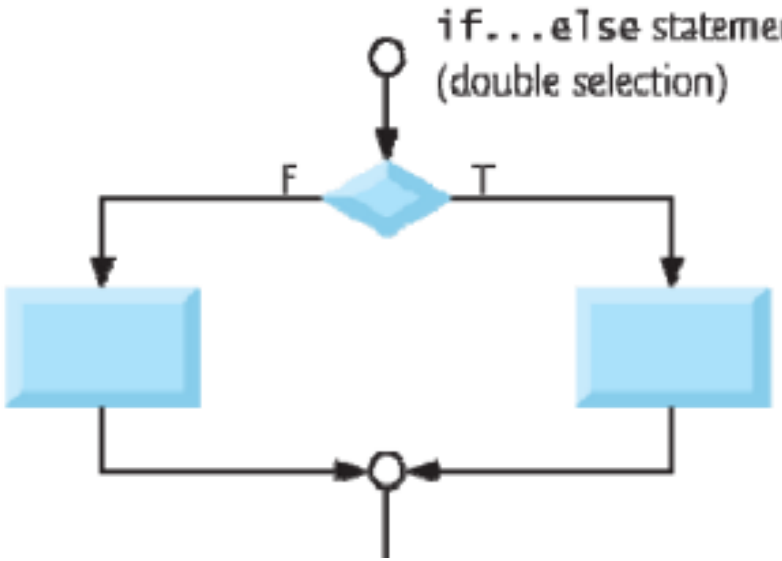


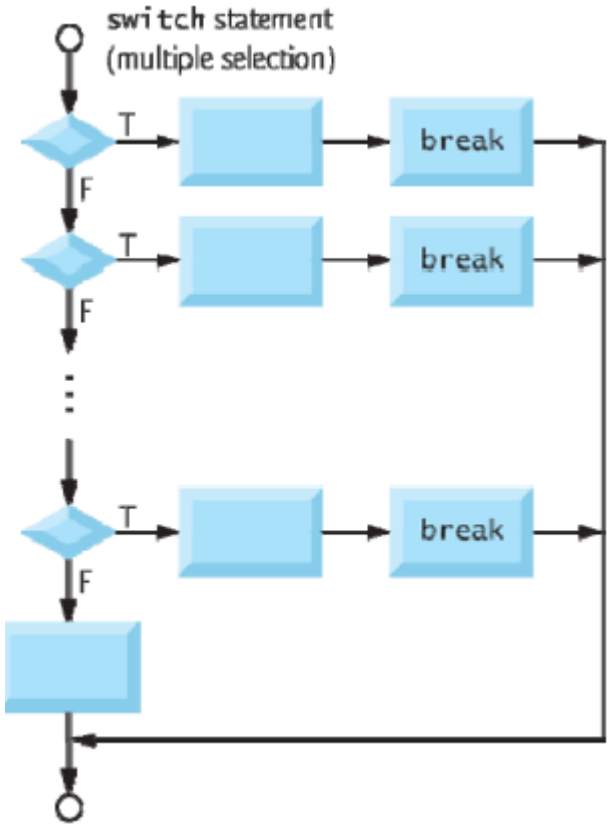


Flowchart Constructs (contd...)

Selection

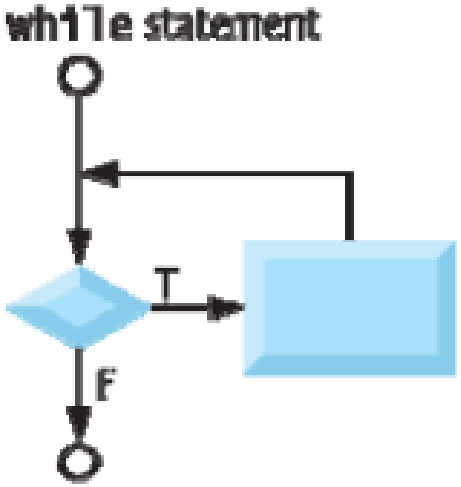


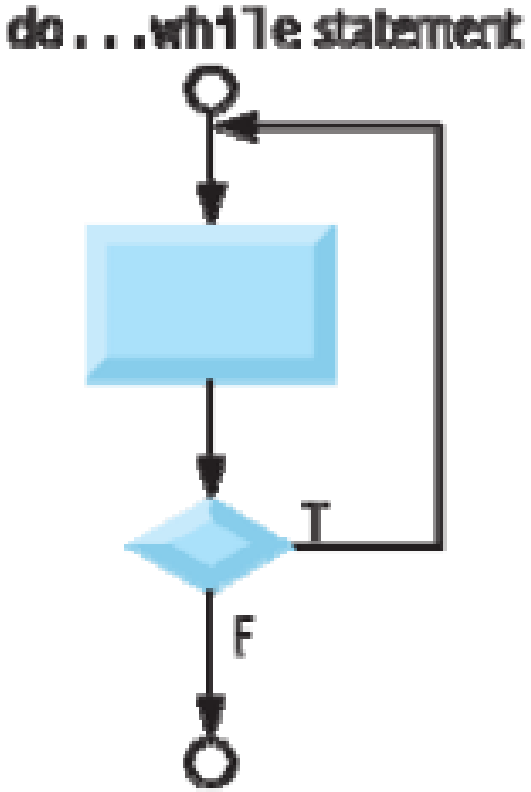


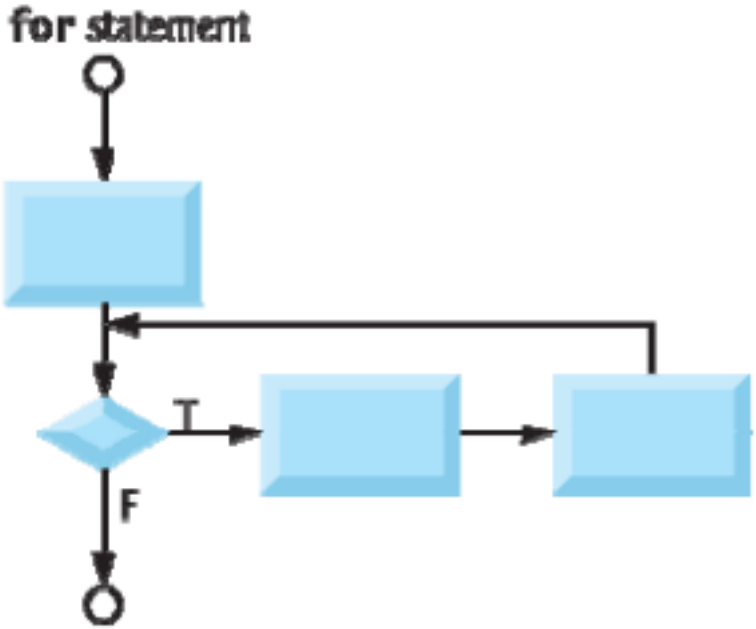


Flowchart Constructs (contd...)

Repetition







Flowchart Examples

1. Find the average of given four numbers
2. Find a profit or loss
3. Print a multiplication table of a given number
4. Calculate factorial of a given number
5. Find the maximum of more than three numbers
6. Exchange the values of two variables
7. Find gcd of two numbers
8. Compute $a^k \bmod n$
9. Check whether the given number is prime or not
10. Locate all the prime numbers between 1 and the given number n
11. Find lcm of two numbers

Next Lecture

Basics of C++