CS118 – Programming Fundamentals

Lecture # 04
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FAST – NUCES, Faisalabad Campus

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Flowchart Common Symbols
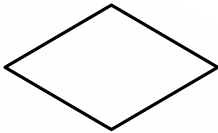
Name	Symbol	Use in flowchart
Oval		Denotes the beginning or end of the program
Parallelogram		Denotes an input
Rectangle		Denotes a process to be carried out (e.g. addition, subtraction etc.)
Diamond		Denotes a decision (or branch) to be made. The program should continue along one of two routes. (e.g. IF/THEN/ELSE)
Hybrid		Denotes and output operation
Flow Line		Denotes the direction of logic flow in the program

if Selection Structure

➥ Flowchart of pseudocode statement
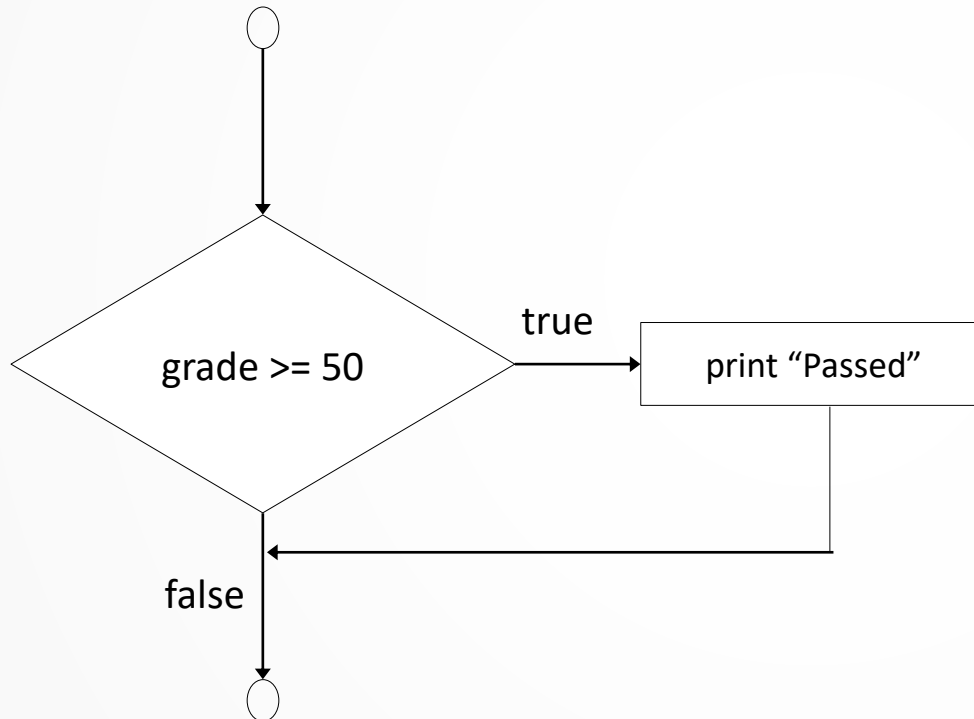
A decision can be made on any expression.

zero - **false**

nonzero - **true**

Example:

3 - 4 is **true**

if/else Selection Structure

- if
  - Performs action if condition true
- if/else
  - Different actions if conditions true or false

Pseudocode

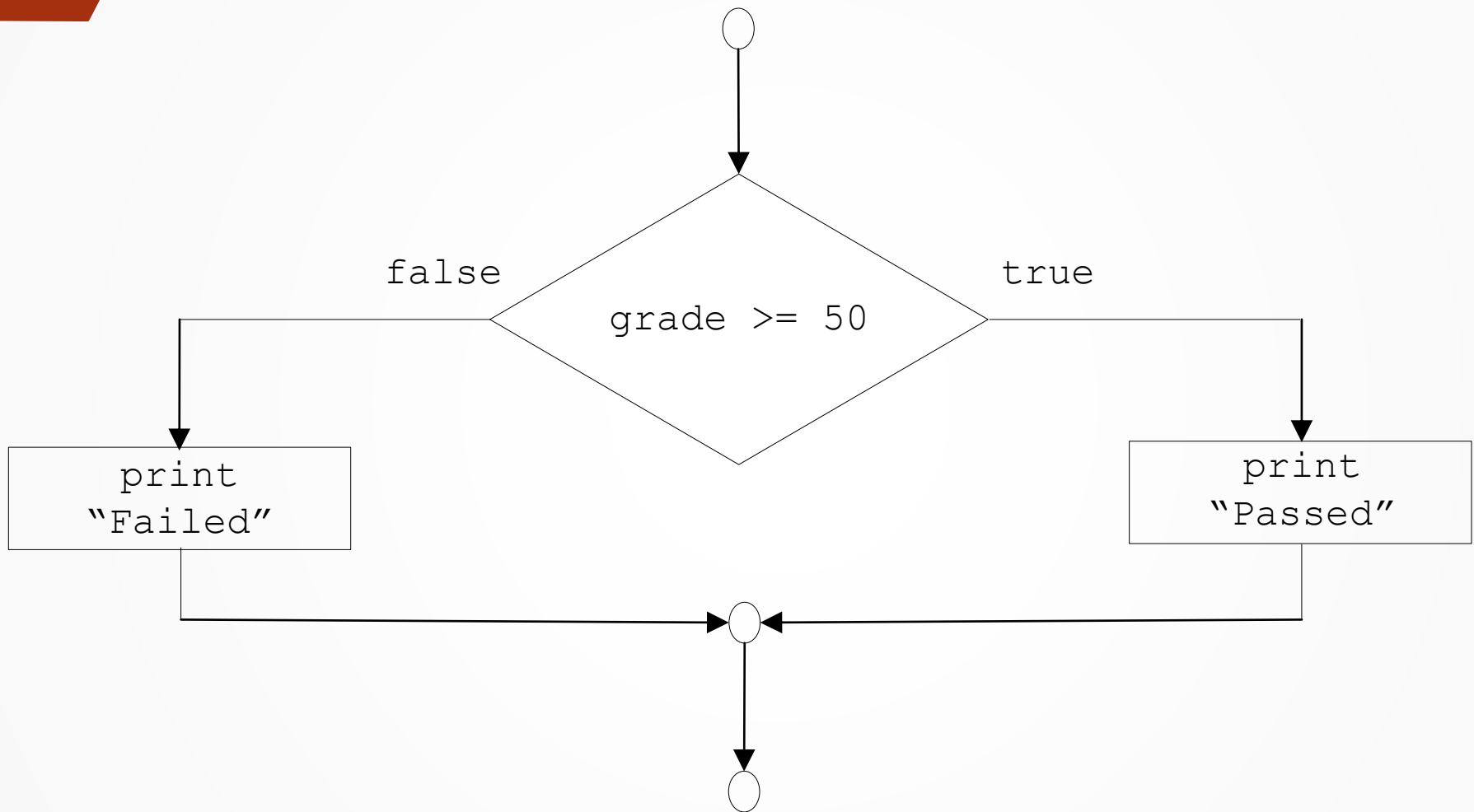if student's grade is greater than or equal to 40
    print "Passed"
else
    print "Failed"

if (grade >= 50)
    Print "Passed";
else
    Print "Failed";

if/else Selection Structure

```
                              ○
                              │
                              ▼
              false        ╱     ╲        true
        ┌────────────────◁  grade >= 50  ▷────────────────┐
        │                   ╲     ╱                        │
        ▼                      ╲╱                           ▼
  ┌───────────┐                                      ┌───────────┐
  │   print   │                                      │   print   │
  │ "Failed"  │                                      │ "Passed"  │
  └───────────┘                                      └───────────┘
        │                                                  │
        └──────────────────────▶○◀──────────────────────┘
                                 │
                                 ▼
                                 ○
```

if/else Selection Structure

➡ Nested if/else structures
  ➡ One inside another, test for multiple cases
  ➡ Once condition met, other statements skipped

if student's grade is greater than or equal to 90
    Print "A"
else
    if student's grade is greater than or equal to 80
        Print "B"
    else
        if student's grade is greater than or equal to 70
            Print "C"
        else
            if student's grade is greater than or equal to 60
                Print "D"
            else
                Print "F"

if/else Selection Structure

➡ Example

if (grade >= 90)   // 90 and above

   Print "A";

else if (grade >= 80) // 80-89

   Print "B";

else if (grade >= 70) // 70-79

   Print << "C";

else if (grade >= 60) // 60-69

   Print "D";

else   // less than 60

   Print "F";

if/else Selection Structure

Compound statement

➡ Set of statements within a pair of braces

```
if ( grade >= 60 )
    Print "Passed";
else {
    Print "Failed";
    Print  "You must take this course again";
}
```

Example

- Write an algorithm that reads **three** numbers and prints the value of the largest number.
  [Hint: You can us IF-THEN-ELSE structure]

Example 6

Step 1: *Input   A, B, C*
Step 2: *if (A>B) then*
        if (A>C) then
        MAX $\leftarrow$ A [A>B, A>C]
       else
       MAX $\leftarrow$ C [C>A>B]
     endif
   else
      if (B>C) then
       MAX $\leftarrow$ B [B>A, B>C]
      else
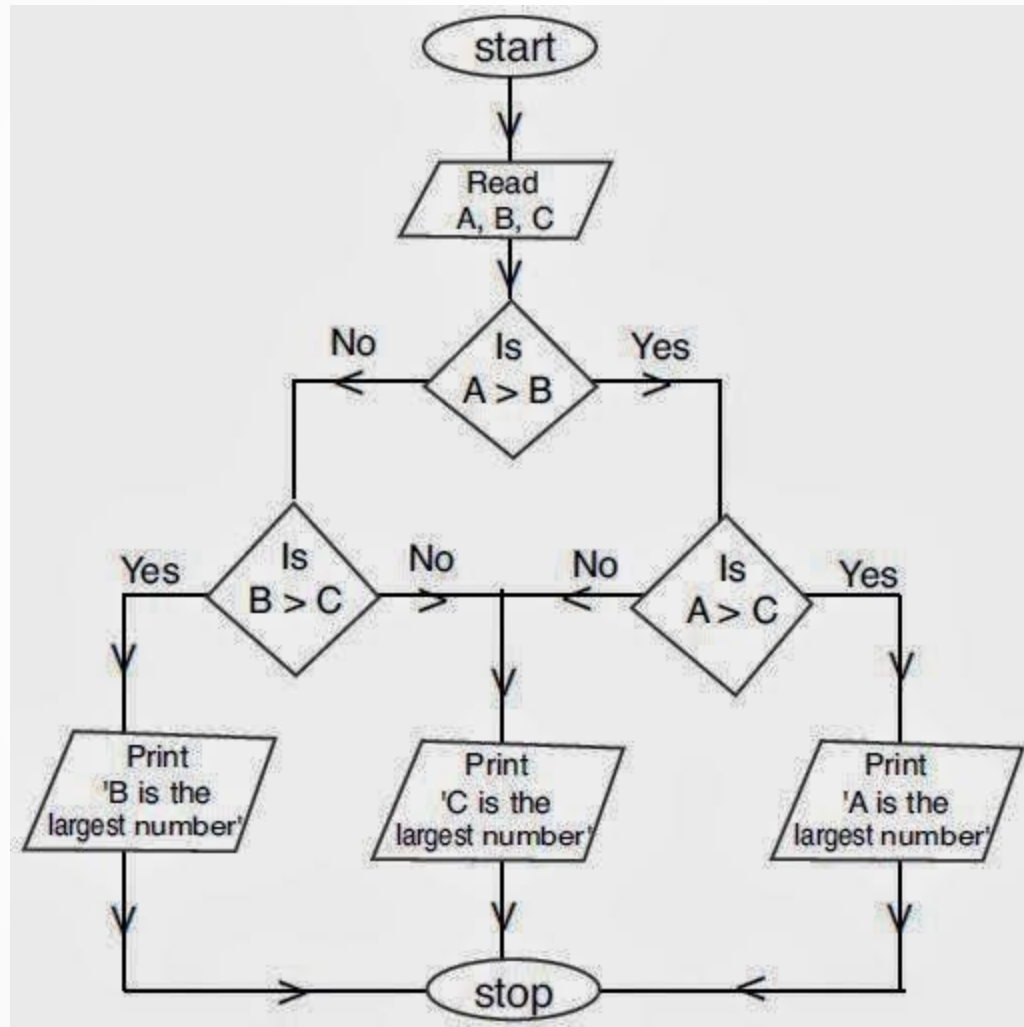   *MAX $\leftarrow$ C [C>B>A]*
     endif
   endif
Step 3: *Print "The largest number is", MAX*

Example

- **Flowchart: Draw the flowchart of the above Algorithm.**

Solution

Questions