CS1002 – Programming Fundamentals

Lecture # 05
Monday, September 06, 2022
FALL 2022
FAST – NUCES, Faisalabad Campus

Muhammad Yousaf

Pseudocode – Comparing two numbers

1.0 start

2.0 declare n1, n2

3.0 input n1,n2

4.0 if (n1 > n2)

    4.1 print "n1 is greater"

5.0 endif

6.0 if (n2 < n1)

     6.1 print "n2 is greater"

7.0 endif

8.0 if (n1 = n2)

    8.1 print "they are equal"

9.0 endif

10.0 end

Nested `if/else` Selection Structure

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

Example 1– Comparing two numbers with nested if-else

1.0 start

2.0 declare n1, n2

3.0 input n1,n2

4.0 if (n1 > n2)

    4.1 print "n1 is greater"

5.0 else

    5.1 if (n2 < n1)

        5.1.1 print "n2 is greater"

    5.2 else

        5.2.1 print "they are equal"

    5.3   endif

6.0 endif

7.0 end

Example 2: Grading with Nested if-else:

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"

Example 2: Pseudocode for Grading with Nested if-else:

```
if ( grade >= 90 ) then              // 90 and above
    Print  "A"
else if ( grade >= 80 )then     // 80-89
    Print "B"
else if ( grade >= 70 ) then        // 70-79
    Print << "C";
else if ( grade >= 60 ) then        // 60-69
    Print "D";
else                                        // less than 60
    Print "F";
end
```

if/else Selection Structure

Compound statement

- Set of statements within a pair of braces

```
if  grade >= 60 then

    Print "Passed"
else

    Print "Failed"

    Print  "You must take this course again"
endif
```

Example 3

- Write pseudocode and draw a flowchart that will calculate the roots of a quadratic equation

- $ax^2 + bx + c = 0$

- Hint $d = b^2 - 4ac$ and roots are
  - $X_1 = (-b + \text{sqrt}(d)) / 2a$
  - $X_2 = (-b - \text{sqrt}(d)) / 2a$
- Real roots are only possible if $d > 0$
- **Cater this as well**

Example 4

- Write a pseudocode and draw a flowchart

  - to read an employee name (NAME), overtime hours worked (OVERTIME), hours absent (ABSENT)

  - determine the bonus payment (PAYMENT)

Bonus Schedule	
OVERTIME – (2/3)*ABSENT	Bonus Paid
>40 hours >30 but ≤ 40 hours >20 but ≤ 30 hours >10 but ≤ 20 hours ≤ 10 hours	5000 4000 3000 2000 1000

Questions