CS19001: Programming and Data Structures Laboratory

DRC, SD, SB, CSE, IIT Kharagpur

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The If-else syntax

```
if (boolean combination of relational expressions)
{ ⟵ scope of if
   program statement(s)
}
else
{ ⟵ scope of else
   program statement(s)
}
```

Nested If-else

```
if(condition1)
{
  if(condition2)
    {
      statement(s);
    }
  else
    { /* execute when
      (condition1 && !condition2)==TRUE */
      statement(s);
    }
}
else{
  statement(s);
}
```

Compute $|xy|$

```
if (((x>=0)&&(y>=0))||((x<0)&&(y<0)))
      z = x * y;
else
      z = -x * y;
```

- Complex conditions (error pron and non-intuitive in some cases)

Compute $|xy|$

```
if (x>=0)
{
    if (y>=0) z = x*y; else z = -(x*y);
}
else
{
    if (y>=0) z = -(x*y); else z = x*y;
}
```

- This is how we think, create sub cases based on simple conditions

Repeated If-else

```
if(condition1){
  statement(s);  /* go to college */
}
else{
  if(condition2){
    statement(s); /* otherwise watch movie*/
  }
  else{
    if(condition3){
      statement(s); /* otherwise, sleep*/
    }
    else{
      ------/*thinking with elimination*/
    }
  }
} /*nesting of conditions is only in else*/
```

Repeated If-else has a simpler syntax

```
if(Condition 1){
  Block 1
}
else if(Condition 2){
  /*else if = same as saying otherwise */
  Block 2
} ------------
else if(Condition n){
  Block n
}
else{
  Block n+1
}
/*need not manage complex hierarchy of braces*/
```

Implementation of the assignment $y = |x|$

```
scanf("%d",&x);
if (x == 0)
  y = 0;
else if (x > 0)
  y = x;
else y = -x;
```

Multiway (> 2) Program flow

- Still now, a program had atmost two possible execution paths at any point of time
- We simply tested boolean conditions
- Similarly, we can try matching an expression with possible set of values it may assume
- The set of possible values have to be known while writing the program

The switch statement

```
switch (E) {
  case val1 :
    Block 1  /*Execute if E = val1*/
    break;
  case val2 :
    Block 2
    break;
  ........
  case valn :
    Block n
    break;
  default   :
  /* Execute if E is equal to none */
    Block n+1
}
```

The break in switch

- In a switch case, once a match is found, further comparisons are disabled.
- But all following statements before the closing brace are executed one by one.
- The break in switch forces exit from switch

Programming Assignments

Complete and submit during lab

Submission and file names

- Create folder in your system "Lab-2-MC-no-X".
- Create program files A2_Roll Number_1.c, A2_Roll Number_2.c, A2 _Roll Number_3.c, $\cdots$ inside the folder.
- Zip the folder to create "Lab-2-MC-no-X.zip".
  - use zip command, u can see 'zip -v' for help
  - Linux command to execute in terminal from same place where the folder exists but from outside the folder
  - : 'zip -r Lab-2-MC-no-X.zip Lab-2-MC-no-X' will create the archive Lab-2-MC-no-X.zip
- Upload the files in the submission link.

Assignment 1

Write a C program which examines the value of a floating-point variable called *temp* and prints one of the following messages, depending on the value assigned to temp. Read the value of *temp* from keyboard.

- "It is ICE and the temperature is _", if the value of *temp* is less than 0
- "It is WATER and the temperature is _", if the value of *temp* is lies between 0 and 100
- "It is STEAM and the temperature is _", if the value of *temp* exceeds 100

Assignment 2

Write a C code (by using the Switch Case) that reads two real positive numbers. Now, enter an operator from the keyboard and perform the operation. The operator can be any of the following

- + (addition)
- - (subtraction)
- * (multiplication) and
- / (division)

Print the output as follows

134.78 + 256.09 = 390.87

20.5 * 18 = 369.0
etc.

Assignment 3

One Alumni of IIT Kharagpur wishes to give a monetary prize to the 2nd year students if the student has CGPA greater than or equal to 9.5 at the end of 1st year. The prize-money is decided with the following rule:

- the student gets the prize of 20 % of his/her yearly (12 months) family-income if the monthly family income is less than Rs. 50000,
- a prize of 10 % of his/her yearly family-income if the monthly family income is greater than or equal to Rs. 50000 but less than Rs. 100000, and
- The student gets only an Excellence Certificate but no money if his/her monthly family income is equal to or greater than Rs. 100000.

Write a C program that reads the CGPA of a 2nd year student (a float) and the monthly family income of the student (an integer), and prints whether the student is selected for the prize or not.

The program also prints the amount of prize-money (another integer, rounded up to the next higher integer) or the "Excellence Certificate", if he/she is selected for the prize.

Assignment 4 : Extra credit for later

Write a C-program to perform the following (NO USE OF ARRAY):

- Read three digit positive integer A.
- Find the sum of all the digits of the number and print it.
- Print the addition of digits at ODD LOCATIONS in the number.
- Print the reverse of the number.

Test case:
A=987
Sum of digits = 24
Addition of odd digits= 9+7=16
NOTE: 123 has '9' in location 1, '7' in location 3
Reverse= 789

Thank You