JAYPEE UNIVERSITY OF ENGINEERING & TECHNOLOGY, GUNA
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Course: Computer Programming Lab
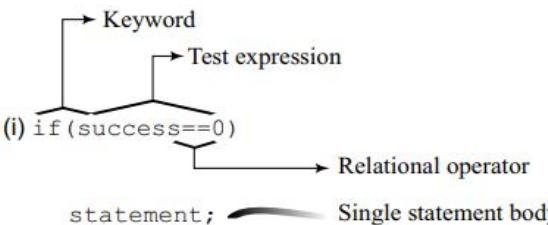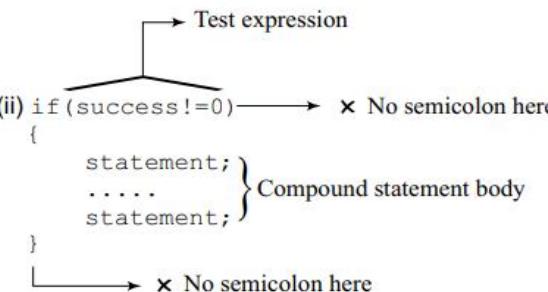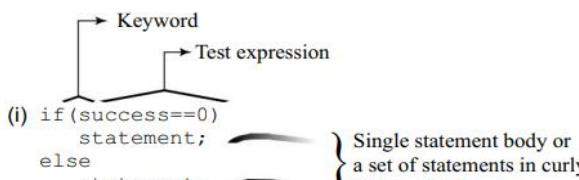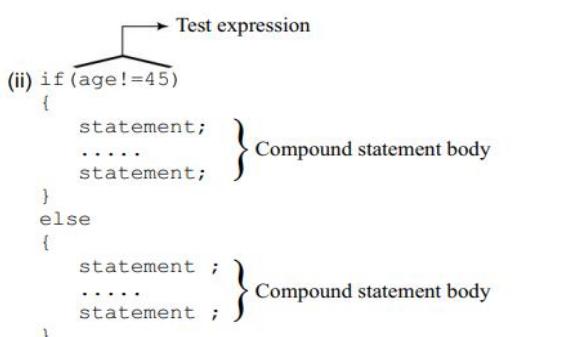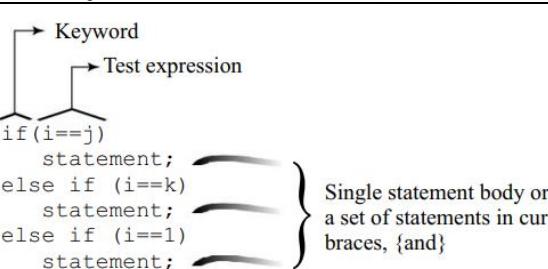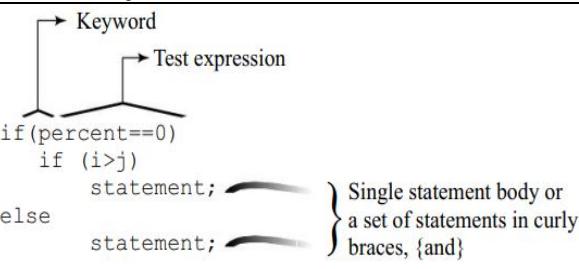### Course Code: CS201
B. Tech. I Sem. (CSE, ECE, MECH, CE, CHE)

Lab-7

Aim: Decision Control Structures: if-else statement

Decision Control Statements: These are the decision making statements that decides the order of execution of statements based on the conditions. If the condition is true, then a set of statements are executed and if the condition is false then another set of statements is executed. Decision making can be done by **if-else** statement and **switch-case** statement. In this lab, only **if-else** statement will be covered. Syntax for various types of **if-else** statements is given below in the table:

Syntax for **if** Statement	Syntax for **If-else** Statement

Syntax for **if-else if–else** Statement	Syntax for **nested if** Statement

- Six relational/equality operators (shown in the operator table of Lab-5) are used to formulate Boolean expressions for making a decision and testing conditions, which returns **true** or **false**.
- Keep in mind that a condition that evaluates to a **zero** value returns **false** while **all non-zero** values always returns **true**. Other than zero, only **null character ('\0')** returns **false**.
- For **single** statement body { } are **optional** while **multiple** statements body { } are **compulsory**.

Conditional (Ternary) Operator: This is kind of similar to the **if-else** statement as it follows the same algorithm as of if-else statement but the **conditional operator** takes **less space** and helps to write the if-else statements in the **shortest way** possible. It is also known as the **ternary operator** as it operates on minimum **three** operands/data. All instructions written using this operator always contain **equal number** of questions marks (**?**) and colons (**:**). This operator can be applied using following syntaxes:

Syntax: Suppose c1 and c2 are the conditional expressions; v1, v2 and v3 are the result values then **ternary operator** can be used as followings:

- c1 ? v1 if c1 is true : v2 if c1 is false;   (Similar to **if-else** statement)
- c1 ? v1 if c1 is true : c2 ? v2 if c2 is true : v3 if c1 and c2 both are false;   (As of **if-else if-else**)
- c1 ? c2 ? v1 if c1, c2 both are true : v2 if c1 is true: v3 if c1, c2 both are false;   (As of **nested if**)

Example#1: Program to compare two integer numbers.

```
#include<stdio.h>
int main ()
{
int n1, n2;
printf ("Enter values two numbers :\n ");
scanf ("%d %d", &n1, &n2);
//Using if-else if-else statement
if (n1 == n2)                                    //Condition test using equality operator
        printf ("Both numbers are equal\n");
else if (n1 > n2)                                //Condition test using greater than operator
        printf ("%d is greater than %d\n", n1, n2 );
else
        printf ("%d is smaller than %d\n", n1, n2 );
//Using conditional (ternary) operator
(n1 == n2) ? printf ("Both numbers are equal") : (n1 > n2) ? printf ("%d is greater than %d", n1,n2 ) :
printf ("%d is smaller than %d", n1, n2 );
return 0;
}
```

Example#2: Program to find that the entered character is in the range of **e** to **t**.

```
#include <stdio.h>
int main()
{   char ch;  scanf ( "%c", &ch );
//Using nested if statement
if (ch >= 'e')                                  //Condition check using relational operator and character
        if (ch <= 't')
                printf ("In the range\n");
        else
                printf ("Out of range\n");
else
        printf ("Out of range\n");
//Using conditional (ternary) operator
(ch >= 'e') ? (ch <= 't') ? printf ("In the range \n") : printf ("Out of range \n") : printf ("Out of range \n");
return 0;   }
```

For first turn of the week:

Exercise#1: Write **user input** program using **if-else** and **conditional operator** to find out whether the entered number is odd or even. Write algorithm and draw the flowchart in your practical book.

Exercise#2: Write **user input** program using **nested if** and **conditional operator** to determine whether the year is a leap year or not. Write algorithm and draw the flowchart in your practical book.
(**Leap year**: divisible by 400 or divisible by 4 but not divisible by 100).

Exercise#3: Write **user input** program using **suitable if statement** to determine whether the character entered is a capital letter, a small letter, a digit or a special character. Write algorithm and draw the flowchart in your practical book.
(**ASCII**: American Standard Code for Information Interchange value range for digits **(0-9): 48-57**; capital letters **(A-Z): 65-90**; small letters **(a-z): 97:122**; special characters: entire range excluding previous three).

For second turn of the week:

Exercise#4: Write **user input** program to determine the grade of students of JUET, Guna using **if-else if-else** and **conditional operator** according to the specified marks as: outstanding grade 'O' if marks >=80; excellent 'A+' if marks >=72; very good 'A' if marks >=64; good 'B+' if marks >=56; average 'B' if marks >=48; below average 'C' if marks >=40, pass 'P' if marks >=35, fail 'F' if marks < 35.

Exercise#5: Write **user input** program using **nested if** and **conditional operator** to check whether a person is eligible to cast the vote (minimum age: 18 year), to get married (21 year), to contest election (25 year), and to be President of India (35 Year) or not.

Exercise#6: Write **user input** program using **suitable if statement** to calculate the employee salary as per the following table:

Gender	Years of Service	Qualifications	Salary
Male	>= 10	Post-Graduate	15000
	>= 10	Graduate	10000
	< 10	Post-Graduate	10000
	< 10	Graduate	7000
Female	>= 10	Post-Graduate	12000
	>= 10	Graduate	9000
	< 10	Post-Graduate	10000
	< 10	Graduate	6000

Practice Questions
(No need to include in your Practical Book)

1. Write a program to find the greatest of the three numbers entered through the keyboard using conditional operators.

2. If the ages of Ram, Shyam and Ajay are input through the keyboard, write a program to determine the youngest of the three.

3. Write a program to check whether a triangle is valid or not, when the three angles of the triangle are entered through the keyboard. A triangle is valid if the sum of all the three angles is equal to 180 degrees.

4. Given the length and breadth of a rectangle, write a program to find whether the area of the rectangle is greater than its perimeter. For example, the area of the rectangle with length = 5 and breadth = 4 is greater than its perimeter.

5. Write a program to check whether a number (entered by the user) is negative or positive.

6. Write a program to check whether an alphabet entered by the user is a vowel or a consonant.

7. Given three points (x_1, y_1), (x_2, y_2) and (x_3, y_3), write a program to check if all the three points fall on one straight line.

8. Write user input program using suitable if statement to find the roots of the quadratic equation and check whether they are real and equal, real and unequal, or imaginary.