Course Name:	**Programming in C**	**Semester:**	**II**
Date of Performance:	**22 / 01 / 2025**	**DIV/ Batch No:**	**C2-2**
Student Name:	**Ashwera Hasan**	**Roll No:**	**16010124107**

Experiment No: 2
Title: Use of decision-making control structures

Aim and Objective of the Experiment:

Write a program in C to demonstrate the use of decision-making control structures

COs to be achieved:

CO2: Illustrate the use of control structures

Theory:

An if-else statement is a conditional statement that executes a different set of statements based on the condition that is true or false.

Syntax :

```
if (condition) {
      //code
}
else {
      //code
}
```

A switch statement is a conditional statement used to check the value of a variable and compare it with all the cases. If the value is matched with any case, then its corresponding statements will be executed.

Syntax :

```
switch (expression) {
    case value1:

        break;
    case value2:
```

```
        break;
        default:

    }
```

Problem Statements:

Write a program for the following

1. The current year and the year the employee joined the organization are entered through the keyboard. Calculate the current month's salary by checking the years the employee served in the organization. (solve using if-else statement)
   Bonus is given to the employee in the below cases:

Year	bonus
0 to 3	1000
>= 3 to <6	2500
>=6 to <10	5000
>= 10	10000

2. Enter the marks of 5 subjects, find the average, and display a student's grade using switch case statements.

   The table below shows the grading system.

Score in subject	Grade
>=90	A
80-89	B
70-79	C
60-69	D
50-59	E
<50	F

Code :

Q1:

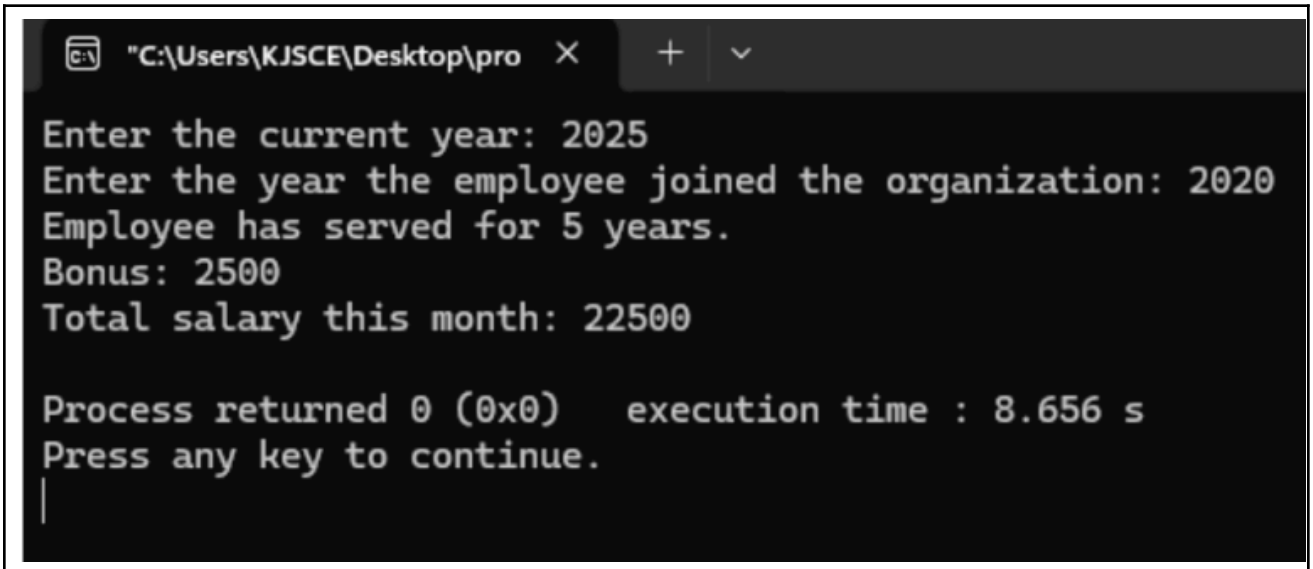
```c
#include <stdio.h>

int main() {
    int currentYear, joiningYear, yearsServed, salary, bonus;
    printf("Enter the current year: ");
    scanf("%d", &currentYear);
    printf("Enter the year the employee joined the organization: ");
    scanf("%d", &joiningYear);
    yearsServed = currentYear - joiningYear;
    if (yearsServed >= 0 && yearsServed <= 3) {
        bonus = 1000;
    } else if (yearsServed >= 3 && yearsServed < 6) {
        bonus = 2500;
    } else if (yearsServed >= 6 && yearsServed < 10) {
        bonus = 5000;
    } else if (yearsServed >= 10) {
        bonus = 10000;
    } else {
        bonus = 0;
        printf("Invalid input! The joining year is after the current year.\n");
        return 0;
    }
    salary = 20000;
    salary += bonus;
    printf("Employee has served for %d years.\n", yearsServed);
    printf("Bonus: %d\n", bonus);
    printf("Total salary this month: %d\n", salary);

    return 0;
}
```

Q2:

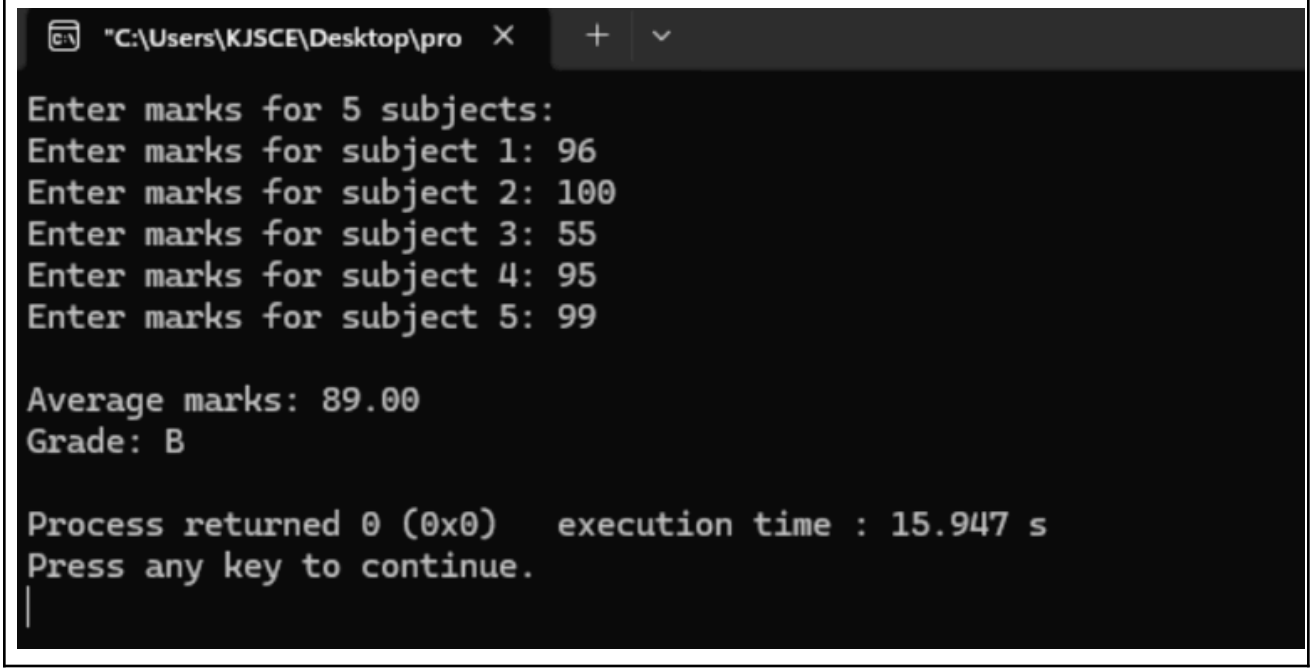
```c
#include <stdio.h>
int main() {
    int marks[5];  // Array to store marks of 5 subjects
    int sum = 0;   // Variable to store total marks
    float average; // Variable to store average marks
    int grade_range; // Variable to store grade based on average
 // Input marks for 5 subjects
    printf("Enter marks for 5 subjects:\n");
    for (int i = 0; i < 5; i++) {
        printf("Enter marks for subject %d: ", i + 1);
        scanf("%d", &marks[i]);
        sum += marks[i];  // Add marks to total sum
    }// Calculate average
    average = sum / 5.0; // Display average
    printf("\nAverage marks: %.2f\n", average);  // Find the grade range by dividing the average by 10
    grade_range = (int)average / 10; // Switch-case to determine grade based on grade_range
    switch (grade_range) {
        case 10: // case for scores >= 90
        case 9:  // case for scores 90-99
            printf("Grade: A\n");
            break;
        case 8: // case for scores 80-89
            printf("Grade: B\n");
            break;
        case 7: // case for scores 70-79
            printf("Grade: C\n");
            break;
        case 6: // case for scores 60-69
            printf("Grade: D\n");
            break;
        case 5: // case for scores 50-59
            printf("Grade: E\n");
            break;
        default: // case for scores < 50
            printf("Grade: F\n");
            break;
    }

    return 0;
}
```

Output:

Q1:



Q2:



Post Lab Subjective/Objective type Questions:

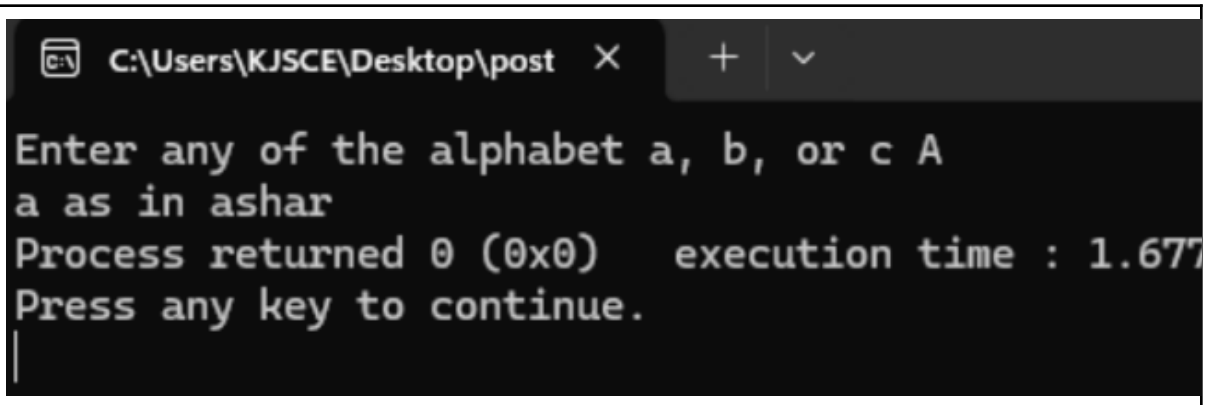
1. Ask the user to input three numbers. Compare three numbers to find the largest of them using
   - Nested if else statement
   - Using ternary operator

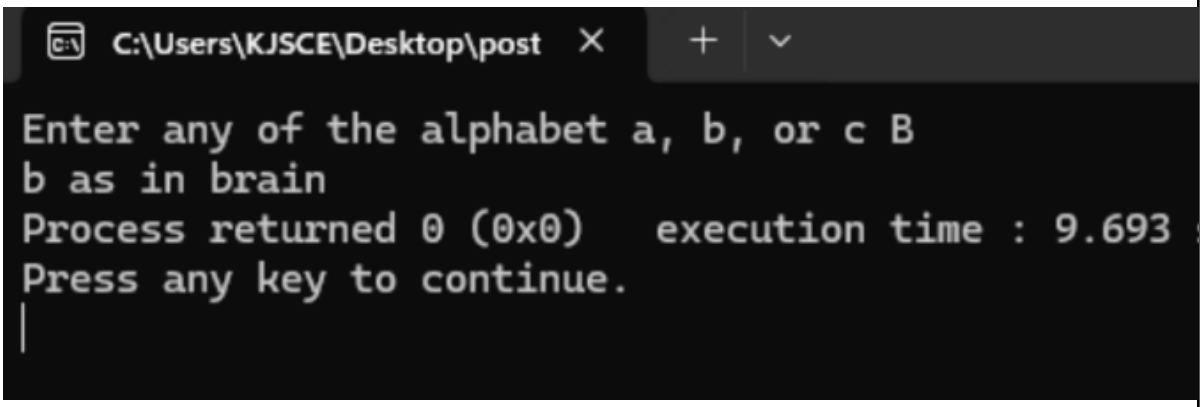
```c
#include <stdio.h>
int main() {
    int num1, num2, num3;
    // Input three numbers
    printf("Enter three numbers: \n");
    printf("Enter number 1: ");
    scanf("%d", &num1);
    printf("Enter number 2: ");
    scanf("%d", &num2);
    printf("Enter number 3: ");
    scanf("%d", &num3);
    // Find the largest number using Nested if-else
    if (num1 >= num2 && num1 >= num3) {
        printf("Using Nested if-else: The largest number is: %d\n",
    }
    else if (num2 >= num1 && num2 >= num3) {
        printf("Using Nested if-else: The largest number is: %d\n",
    }
    else {
        printf("Using Nested if-else: The largest number is: %d\n",
    }
    // Find the largest number using Ternary operator
    int largest = (num1 >= num2 && num1 >= num3) ? num1 :
                  ((num2 >= num1 && num2 >= num3) ? num2 : num3);
    // Output the result from ternary operator
    printf("Using Ternary operator: The largest number is: %d\n", la

    return 0;
}
```

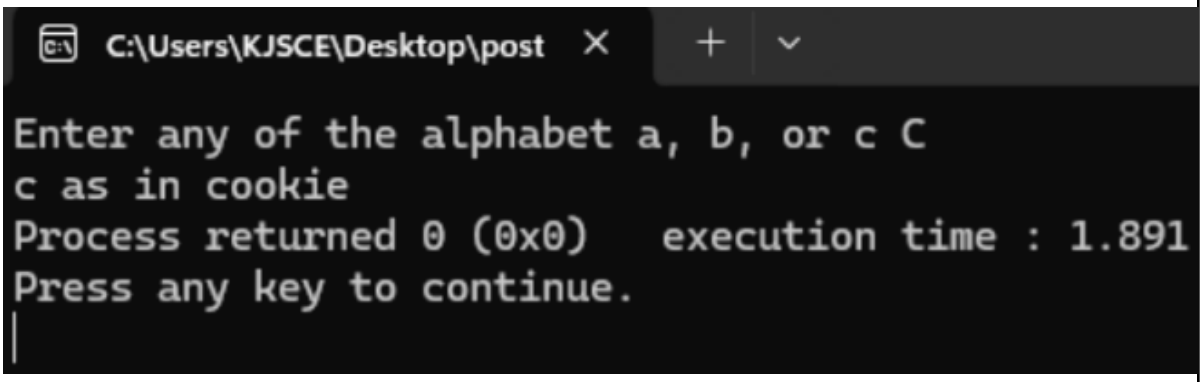
```
C:\Users\KJSCE\Desktop\post
Enter three numbers:
Enter number 1: 25
Enter number 2: 100
Enter number 3: 68
Using Nested if-else: The largest number is: 10
Using Ternary operator: The largest number is:

Process returned 0 (0x0)   execution time : 6.6
Press any key to continue.
```

2. Check the output of the following program:

```
main( )
{
char ch ;
printf ( "Enter any of the alphabet a, b, or c " ) ;
scanf ( "%c", &ch ) ;
switch ( ch ){
     case 'a' :
     case 'A' :
          printf ( "a as in ashar" ) ;
     break ;
     case 'b' :
     case 'B' :
          printf ( "b as in brain" ) ;
     break ;
     case 'c' :
     case 'C' :
          printf ( "c as in cookie" ) ;
     break ;
     default :
          printf ( "wish you knew what are alphabets" ) ;
}}
```







Conclusion:

This experiment was successful in acquainting students with the use of conditionals in C and its subsequent conditions like nested and chained conditionals.

Signature of faculty in-charge with Date: