Lab-8

Aim: Decision Control Structures: switch-case statement

Switch-case statement: Other than if-else statement, it is another type of decision control structure which is used for executing one condition from multiple conditions. It is similar to an if-else if- else statement. These are the substitute for long if statements that compare a variable to several integral values. The switch statement is a multi-way branch statement. It provides an easy way to dispatch execution to different parts of code based on the value of the expression. Syntax for various types of **switch-case** statements is given below in the table:

Syntax for **switch-case** with **break** and **default**	Syntax for **switch-case** without **break** and **default**

	``switch(n)
	{
	case 'a': case 'A': //using character value
	     statement1; statement2;
	case 'g': case 'G':
	
	case '3':
	     statement3; statement4;
	
	     . . .
	     . . .
	     . . .
	case 'n':
	     statements;
	}```

Syntax for **switch-case** with range of cases	Syntax for **nested switch-case**

``switch(n)
{
case 1: case 2: case 3: case 4: // or case 1 ... 4:
     statement;
     break;
case 5: case 6: case 7: case 8: //or   case 5 ... 8:
     statement;
     break;
     . . .
     . . .
     . . .
default:
     statement;
}```
	``switch(a) {
	  case 1: statement;
	             break;
	  case 2:
	          switch(b)
	          {
	          case 1: statement;
	                   break;
	          case 2: statement;
	                   break;
	          }
	  break;
	  default: statement;
	}```

- Switch-case evaluates given expression and based on the evaluated value (matching a certain condition), it executes the statements associated with it. Basically, it is used to perform different actions based on different conditions (cases).
- In a switch statement, the "**case value**" must be of "**char**" and "**int**" type only.
- There can be **one or N** number of cases.
- The values in the case must be **unique**.
- Each statement of the **case** can have a **break** statement.
- This **break** statement is used to stop the execution inside a switch block. It helps to terminate the switch block and break out of it. When a break statement is reached, the switch terminates, and the flow of control jumps to the next line following the switch statement.
- The **break statement is optional**. If omitted, execution will continue on into the next case. The flow of control will fall through to subsequent cases until a break is reached.
- The **default** keyword is used to specify the set of **statements to execute if there is no case match**. It is **optional** to use the default keyword in a switch case. Even if the switch case statement does not have a default statement, it would run without any problem.

Example#1: Program to create a simple calculator	**Example#2:** Program to print a season of the year

``c
#include<stdio.h>
int main()
{
    char choice; int x, y;
    printf ("Enter an operator: +,-,*,/,%% \n");
    scanf (" %c", &choice);
    printf ("Enter the two numbers: ");
    scanf ("%d %d", &x, &y);
    switch (choice)
    {
     case '+':
       printf ("%d + %d = %d\n", x, y, x + y);
       break;
     case '-':
       printf ("%d - %d = %d\n", x, y, x - y);
       break;
     case '*':
       printf ("%d * %d = %d\n", x, y, x * y);
       break;
     case '/':
       printf ("%d / %d = %d\n", x, y, x / y);
       break;
     case '%':
       printf ("%d %% %d = %d\n", x, y, x % y);
       break;
     default:
       printf ("Invalid Operator Input\n");
    }
   return 0;
}```
	``c
	#include<stdio.h>
	int main()
	{
	int month;
	printf ("Enter the month number ");
	scanf ("%d", &month);
	  switch (month)
	  {
	   case 3 ... 5:
	     printf ("Spring");
	     break;
	   case 6 ... 8:
	     printf ("Summer");
	     break;
	   case 9 ... 11:
	     printf ("Autumn");
	     break;
	   case 1 ... 2 : case 12:
	     printf ("Winter");
	     break;
	   default: printf("Enter valid month number");
	     break;
	  }
	 return 0;
	}```

For first turn of the week:

Exercise#1: Write **menu driven** (user input) program using **switch-case** statement to print a day of the week. Take day number (Sunday: 1, Monday: 2…) as control input. Write algorithm and draw the flowchart in your practical book.

Exercise#2: Write **menu driven** program using **switch-case** statement to identify whether the input character is lower case, upper case, digit or special character. Write algorithm and draw the flowchart in your practical book.

Exercise#3: Write a **menu driven** program using **switch-case** statement to calculate the body mass index (BMI) of a user in the nearest higher integer value and identify the category whether the user is underweight, normal weight or overweight. Write algorithm and draw the flowchart in your practical book. (Include additional header file **math.h** to use **ceil (a) function** to round-up floating number into next higher integer value).
(**BMI**: This is defined as the body mass in kilograms (kg) divided by the square of the body height in meters (m) and is expressed in units of kg/m^2. BMI <= 18: underweight; 18 < BMI <= 25: normal weight; BMI > 25: overweight)

For second turn of the week:

Exercise#4: Consider your friend Dev has user id 3214 and password 6580. Write a C program using **nested switch-case** to print "Welcome dear Dev" if he enters his correct user id and then correct password otherwise show a message "Please enter correct user id and password".

Exercise#5: Suppose you are asked to create a **menu driven** C-language program using **switch-case** statement for the billing system of JUET cafeteria. The program should accept type of food and quantity as inputs and displays the total payable amount as per customer order. Assume cafeteria serves Burger @ ₹85, Pizza @ ₹125, Sandwich @ ₹60 and Lassi @ ₹40.

Exercise#6: Suppose you are searching for a department in a university and you're asked to write **menu driven** program using **nested switch-case** to select a school from a choice of three schools and then to select a department that falls under your choice of school. Hierarchy of university schools and their departments is as following:

1. School of Computer Science
   a. Department of Informatics
   b. Department of Machine Learning
2. School of Engineering
   a. Department of Electronics Engineering
   b. Department of Mechanical Engineering
3. School of Business
   a. Department of Commerce
   b. Department of Purchasing

1. Write a C program to identify whether the entered character is vowel or consonant using switch-case statement.

2. Consider an integer is input through keyboard. If character is 1 then perform addition of two numbers, if 2 then perform subtraction of two numbers and for all others perform multiplication of two numbers. Write a C program for the same.

3. Consider a number is input through keyboard. If number is between 0 to 10 then square the number. If number is between 11 to 20 then cube the number and for all other conditions number will be as it is. Write a C program for the same.

4. Write a C program print number of days in a month using switch case.

5. Write a C program to check whether a number is positive, negative or zero using switch case.

6. Write a C program to find maximum between two numbers using switch case.

7. Write a menu driven program using (switch-case) which has following options:
    1. Area of a circle.
    2. Perimeter of a circle
    3. Area of a Square
    4. Perimeter of a square
    5. Area of a triangle
    6. Perimeter of a triangle
    7. Exit

8. Write a C program to compute the EMI amount for a customer's purchase on loan using switch control statement.