Programming Fundamentals (CT-175) Lab 05

Conditional Structure – Multiple Selection Statements - Switch-Case, Nested Switch-Case, and Break

Objectives

The objective of this lab is to familiarize students with multiple selection statement. By the end of this lab students will be able to write conditional programs by using different simple and nested multiple selection statements.

Tools Required

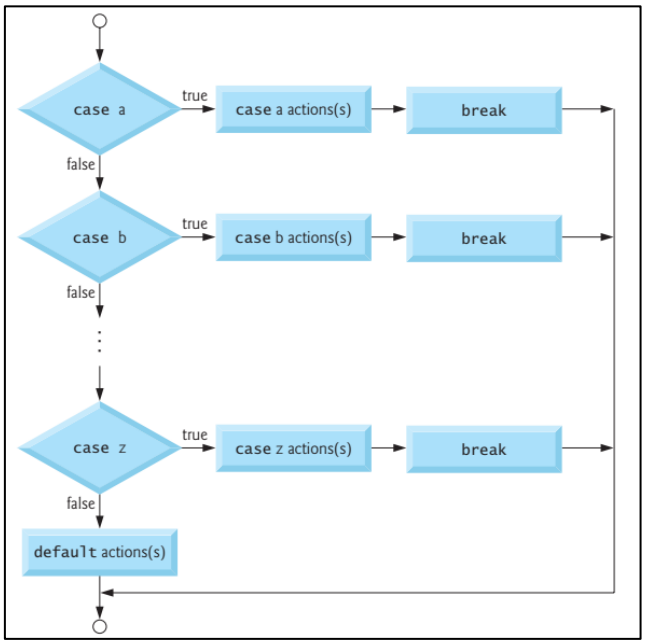
DevC++ IDE

Course Coordinator –
Course Instructor –
Lab Instructor –
Prepared By Department of Computer Science and Information Technology
NED University of Engineering and Technology

Multiple Selection Statement in C

The switch statement is defined as multiple selection construct and is intended to simplify series of if/else statements when comparing a single integer. The switch statement consists of a series of case labels, an optional default case and statements to execute for each case, as shown in the following diagrams. The switch statement is different from all other control statements in that braces are not required around multiple actions in a case of a switch. Although the case clauses and the default case clause in a switch statement can occur in any order, it's common to place the default clause last.

```
switch (selector)
{ case L1: statements1; break;
  case L2: statements2; break;
  ...
  default: statements_n;
}
```



The break statement causes program control to continue with the first statement after the switch statement. The break statement is used because the cases in a switch statement would otherwise run together. If break is not used anywhere in a switch statement, then each time a match occurs in the statement, the statements for all the remaining cases will be executed. The flowchart makes it clear that each break statement at the end of a case causes control to immediately exit the switch statement.

When using the switch statement, remember that each individual case can test only a constant integral expression. A character constant can be represented as the specific character in single quotes, such as 'A'. Characters must be enclosed within single quotes to be recognized as character constants—characters in double quotes are recognized as strings.

```c
#include <stdio.h>
    int main() {
        int num = 8;
        switch (num) {
            case 7:
                printf("Value is 7");
                break;
            case 8:
                printf("Value is 8");
                break;
            case 9:
                printf("Value is 9");
                break;
            default:
                printf("Out of range");
                break;
        }
        return 0;
    }
```

```c
// find whether a character is vowel or consonant
#include <stdio.h>
int main(){
    char ch;
    printf("Enter any character: ");
    scanf("%c", &ch);
    switch(ch){ /* Switch ch value */
        case 'a':
        case 'e':
        case 'i':
        case 'o':
        case 'u':
        case 'A':
        case 'E':
        case 'I':
        case 'O':
        case 'U':
            printf("Vowel");
            break;
        default: printf("Consonant");   }
    return 0;
}
```

Example 01: Design a calculator using numbers to choose operators, if 1 is pressed then addition is performed, if 2 is pressed then subtraction if 3 is pressed then multiplication, if 4 is pressed then division otherwise print invalid choice.

```c
#include <stdio.h>
int main() {
    int num1, num2, choice;
    printf ("Enter two numbers\n");
    scanf("%d%d", &num1, &num2);

    printf("Press \n 1 for sum \n 2 for sub \n 3 for mul \n 4 for div\n");
    scanf ("%d", &choice);

    switch (choice) {
        case 1:
            printf("Sum = %d\n", num1 + num2);
            break;
        case 2:
            printf("Subtraction = %d\n", num1 - num2);
            break;
        case 3:
            printf("Multiplication = %d\n", num1 * num2);
            break;
        case 4:
            printf("Division = %d\n", num1 / num2);
            break;
        default:
            printf("Enter valid choice\n");
    }
}
```

Nested Switch-Case Statements

Placing the simple switch case statements inside an existing case statement is called nested switch-case statement. Each block of nested switch case statement, logically performs the same as simple switch case statement. Following is the syntax of nested switch case statement.

```c
#include <stdio.h>
int main() {
    int ID, password;
    printf("Plese Enter Your ID:\n ");
    scanf("%d", & ID);
    switch (ID) {
        case 500:
            printf("Enter your password:\n ");
            scanf("%d", & password);
            switch (password) {
                case 000:
                    printf("Welcome Dear Programmer\n");
                    break;
                default:
                    printf("incorrect password");
                    break;
            }
            break;
        default:
            printf("incorrect ID");
            break;
    }
}
```

Example 02: Searching for departments in a university with hierarchal structure, that is, we have schools and then under each school we have different departments.

```c
#include<stdio.h>
int main()
{
  int a,b;
  printf("1.School of Computer Science\n");
  printf("2.School of Business\n");
  printf("3.School of Engineering\n");
  printf("make your selection\n");
  scanf("%d",&a);
  switch (a)
  {
    case 1:
      //code to be executed
      //if school of computer science is chosen;
      break;
    case 2:
      //code to be executed
      //if school of business is chosen;
      printf("Available Departments\n"
      printf("1.Department of commerce\n");
      printf("2.Department of purchasing\n");
      printf("Make your selection.\n");
      scanf("%d",&b);

      //inner switch to display the departments
      //under the school of commerce
      switch(b)
      {
        case 1:
        // code to be executed if b = 1;
        printf("You chose Department of commerce\n" );
        break;
        case 2:
        // code to be executed if b = 2;
        printf("You chose Department of purchasing" );
        break;
      }
      break;
  }
}
```

Exercise

1. You must have seen the question before deleting anything like “Are you sure to delete [Y/y] / [N/n] ? Create a program that asks for this question if user enters Y or y it prints “Deleted successfully”. If the user enters N or n it prints “Delete cancelled” otherwise it prints choose the right option using switch statement.
2. Write a program to control a coffee machine. Allow the user to input the type of coffee as B for Black and W for White. Ask the user if the cup size is double and if the coffee is manual. The following table details the time chart for the machine for each coffee type. Display a statement for each step. If the coffee size is double, increase the baking time by 50 percent. Use functions to display instructions to the user and to compute the coffee time.

Operation	White Coffee	Black Coffee
Put Water	15 mins	20 mins
Sugar	15 mins	20 mins
Mix Well	20 mins	25 mins
Add Coffee	2 mins	15 mins
Add Milk	4 mins	-
Mix Well	20mins	25 mins

3. Write a program in which user enters his NTS and F.Sc marks and your program will help student in selection of university. Based on these marks Student will be allocated a seat at different department of different university.

   Oxford

   IT: Above 70% in Fsc. and 70 % in NTS

   Electronics: Above 70% in Fsc. and 60 % in NTS

   Telecommunication Above 70% in Fsc. and 50 % in NTS

   MIT

   IT: 70% - 60 % in Fsc. and 50 % in NTS

   Chemical: 59% – 50 % in Fsc. and 50 % in NTS

   Computer: Above 40% and below 50 % in Fsc. and 50 % in NTS
4. Using IF and Switch statement, write a program that displays the following menu for the food items available to take order from the customer:

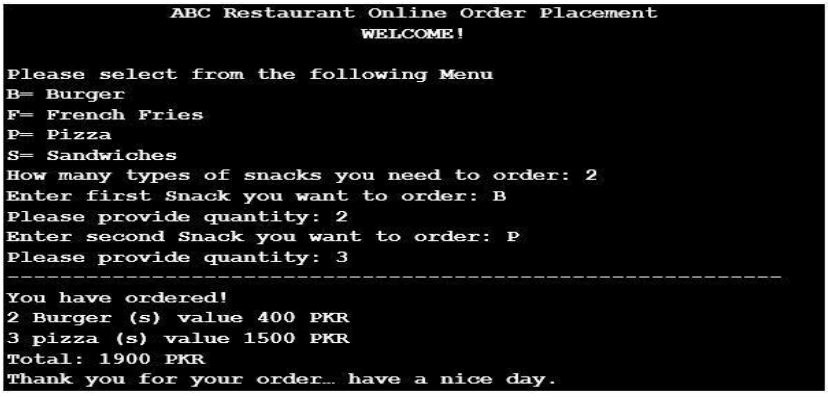
   B= Burger (Rs. 200)

   F= French Fries (Rs. 50)

   P= Pizza(Rs. 500)

   S= Sandwiches (Rs. 150)

   The costumer can order any combination of available food. The program first ask to enter the no of types of snacks i.e. 2, 3 or 4 then it ask to enter the choice i.e. B for Burger and then for quantity. The program should finally display the total charges for the order.



Lab 05 Evaluation		
Student Name:	**Student ID:**	**Date:**
Task No.	**Marks**	**Remarks by teacher in accordance with the rubrics**
1		
2		
3		
4		
5		