NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES
ISLAMABAD CAMPUS
PROGRAMMING FUNDAMENTAL (CS118) - FALL 2018
ASSIGNMENT-3

Due Date: October 08, 2018 (11:30pm)
Instructions:

1. *Read all instructions carefully and apply them in your codding.*
2. *Write the C++ programs for all the question.*
3. *Solution to all the problems should be written in a separate (.cpp) file.*
4. *Submit the source code via **Google classroom**. Submissions via email will not be accepted.*
5. *Use proper naming convention to name the file containing source code.*
   For example, the file containing the source code for first question of the first assignment should be named as i18xxxx_assignment3_q1.pp, replace i18xxxx with your roll number.
6. ***The output should be well presented.** There will be marks of the presentation.*
7. ***Use proper checks where required**. There will be marks of proper checks too.*
8. *Do not **plagiarize**. Use efficient, simple and clean logics and codes.*
9. *Use proper **indentation** in your code. Indentation improves **readability** and helps in **debugging**.*
10. *Use appropriate naming conventions for **variable names**.*
11. *Note: You have to follow the submission instructions to the letter. Failing to do so can get a zero in assignment. We are not going accept any file without the specified naming convention whatever the reason will be.*

1) Given a number as input, if the number is between 1 and 20 both inclusive, then print the number in words otherwise print "not in range".
2) Write a lottery game application that will generate three random numbers each between 0 and 9. The user should guess three numbers and the program should compare each of the user's guess to the three random and display an appropriate output based on whether they got:

   -any one matching
   -two matching
   -three matching, not in order
   -three matching in exact order
   -or no matches at all

   HINT : you can generate random number by using following code

```
#include <cstdlib>
#include <ctime>
int main()
{
    std::srand( std::time(0) );
```

```
    int rand_num1 = std::rand() % 10 ;
}
```

3) A library charges a fine for every book returned late. For first 5 days the fine is 50 rupees, for 6-10 days fine is 100 rupees and above 10 days fine is 150 rupees. If you return the book after 30 days your membership will be cancelled. Write a program to accept the number of days the member is late to return the book and display the fine or the appropriate message.

4) Any character is entered through the keyboard, write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. Hint: You can use the ASCII values for that.

5) A university has the following rules for a student to qualify for a degree with A as the main subject and B as the subsidiary subject:
   (a) He should get 55 percent or more in A and 45 percent or more in B.
   (b) If he gets than 55 percent in A he should get 55 percent or more in B. However, he should get at least 45 percent in A.
   (c) If he gets less than 45 percent in B and 65 percent or more in A he is allowed to reappear in an examination in B to qualify.
   (d) In all other cases he is declared to have failed.

   Write a program to receive marks in A and B and Output whether the student has passed, failed or is allowed to reappear in B.

6) The colors red, blue, and yellow are known as the primary colors because they cannot be made by mixing other colors. When you mix two primary colors, you get a secondary color, as shown here:
   - When you mix red and blue, you get purple.
   - When you mix red and yellow, you get orange.
   - When you mix blue and yellow, you get green.

   Design a program that prompts the user to enter the first letter of names of two primary colors to mix. If the user enters anything other than “r,” “b,” or “y,” the program should display an error message. Otherwise, the program should display the name of the secondary color that results. Implement it using if\else structure and then switch structure.

7) A certain grade of steel is graded according to the following conditions:
   - Hardness must be greater than 50
   - Carbon content must be less than 0.7
   - Tensile strength must be greater than 5600

   The grades are as follows:
   - Grade is 10 if all three conditions are met
   - Grade is 9 if conditions (i) and (ii) are met
   - Grade is 8 if conditions (ii) and (iii) are met
   - Grade is 7 if conditions (i) and (iii) are met
   - Grade is 6 if only one condition is met
   - Grade is 5 if none of the conditions are met

Write a program, which will require the user to give values of hardness, carbon content and tensile strength of the steel under consideration and output the grade of the steel.

8) Write a code that takes two integers as input representing a month and day and prints the season for that month and day. Assume that months are specified as an integer between 1 and 12 (1 for January, 2 for February, and so on) and that the day of the month is a number between 1 and 31. If the date falls between 16/12 and 15/3, you should print "Winter". If the date falls between 16/3 and 15/6, you should print "Spring". If the date falls between 16/6 and 15/9, you should print "Summer". And if the date falls between 16/9 and 15/12, you should print "Fall".

9) Mr. Books Booksellers has a book club that awards points to its customers based on the number of books purchased each month. The points are awarded as follows:
   - If a customer purchases 0 books, he or she earns 0 points.
   - If a customer purchases 1 book, he or she earns 5 points.
   - If a customer purchases 2 books, he or she earns 15 points.
   - If a customer purchases 3 books, he or she earns 30 points.
   - If a customer purchases 4 or more books, he or she earns 60 points.

   Design a program that asks the user to enter the number of books that he or she has purchased this month and displays the number of points awarded.

10) Write a program that displays the following menu:

    Geometry Calculator

    1. Calculate the Area of a Circle
    2. Calculate the Area of a Rectangle
    3. Calculate the Area of a Triangle
    4. Quit

    Enter your choice (1-4):

    If the user enters 1, the program should ask for the radius of the circle and then display its area. Use the following formula: area = πr2 Use 3.14159 for π and the radius of the circle for r.

    If the user enters 2, the program should ask for the length and width of the rectangle and then display the rectangle's area. Use the following formula: area = length * width

    If the user enters 3 the program should ask for the length of the triangle's base and its height, and then display its area. Use the following formula: area = base * height * .5

    If the user enters 4, the program should end.

    Input Validation: Display an error message if the user enters a number outside the range of 1 through 4 when selecting an item from the menu. Do not accept negative values for the circle's radius, the rectangle's length or width, or the triangle's base or height.

11) Write a program that takes coordinates (x, y) of a center of a circle and its radius from the user, the program will determine whether a point lies inside the circle, on the circle or outside the circle.

12) Write a program that asks for the number of calories and fat grams in a food. The program should display the percentage of calories that come from fat. If the calories from fat are less than 30% of the total calories of the food, it should also display a message indicating that the food is low in fat.

- One gram of fat has 9 calories, so
- Calories from fat = fat grams * 9
- The percentage of calories from fat can be calculated as
- Calories from fat ÷ total calories

Input Validation: Make sure the number of calories and fat grams are not less than 0. Also, the number of calories from fat cannot be greater than the total number of calories. If that happens, display an error message indicating that either the calories or fat grams were incorrectly entered.

13) Time Calculator: Design a program that asks the user to enter a number of seconds, and works as follows:
    - There are 60 seconds in a minute. If the number of seconds entered by the user is greater than or equal to 60, the program should display the number of minutes in that many seconds.
    - There are 3,600 seconds in an hour. If the number of seconds entered by the user is greater than or equal to 3,600, the program should display the number of hours in that many seconds.
    - There are 86,400 seconds in a day. If the number of seconds entered by the user is greater than or equal to 86,400, the program should display the number of days in that many seconds.

14) Write C++ program **USING SWITCH STATEMENT** that plays the game of "Rock, paper, scissors." In this game, two players simultaneously say (or display a hand symbol representing) either "rock," "paper," or "scissors." The winner is the one whose choice dominates the other. The rules are: paper dominates (wraps) rock, rock dominates (breaks) scissors, and scissors dominate (cut) paper. Declares and initializes First player and second player variables at the start).

    You can use 1=rock, 2=paper,3=scissors

    Examples:

    First player = 1, second player = 1

    Sample Output: Draw

    First player = 1, second player = 2

    Sample Output: 2nd player wins

15) Rewrite/Recode the **problem 14** using if multi-selector.

16) Using Nested Switch statement, write a program that displays the following menu for the food items available to take order from the customer:

- B= Burger
- F= French Fries
- P= Pizza
- S= Sandwiches

After taking inputs for food item your program will ask four different categories for each food item for example if user press B for Burger it will display following menu:

- Burger 1 Rs. 200 = 1
- Burger 2 Rs. 250 = 2
- Burger 3 Rs. 300 = 3
- Burger 4 Rs. 350 = 4

Similar menu will be open for other food Items.

After taking inputs the food items and food category your program will ask quantity of food item for a particular category required. For example, if user press B for Burger 1 it will display following menu:

- For 1 Burger = A
- For 2 Burgers = B
- For 4 Burgers = C

Similar menu will be open for other food Categories.

After taking all inputs from user your program must calculate appropriate bill for a user.

For example, if user enters B for Food Item 2 for food category and C for 4 burgers it will displays bill as:

Your total bill is = 1400 RS

17) Rewrite/Recode the **problem 16** using if multi-selector.