A201 Computer Programming
Control Structures

Due: June 9, 2024

Submit your source codes (cpp) and program output screenshots (MS Word) as one zip file at the Blackboard.

Note: The submission instructions for all labs are same as lab 01 (also explained in the video titled "IDE Installation & Labs Submission Procedure"). Any change in the submission procedure will be communicated otherwise.

Programming Exercises (10 points each)

1. Write a program that asks the user to enter a number within the range of 1 through 10. Use a switch statement to display the Roman numeral version of that number.
   Input Validation: Do not accept a number less than 1 or greater than 10.

2. The colors red, blue, and yellow are known as 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.

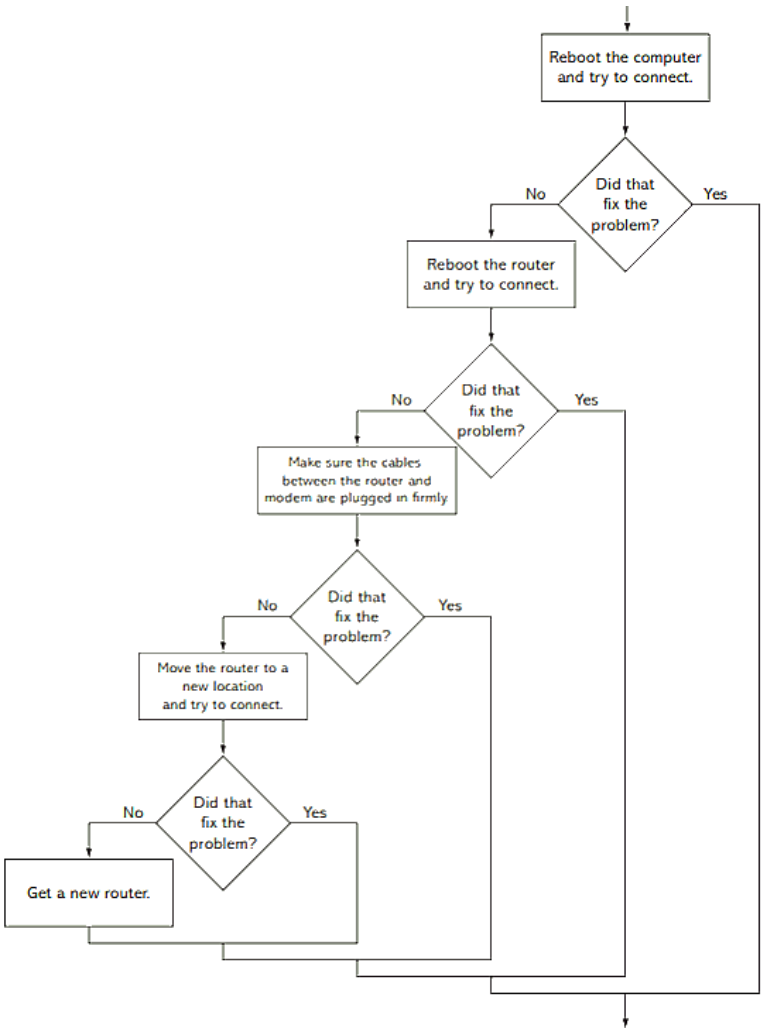
   Write a program that prompts the user to enter the names of two primary colors to mix. If the user enters anything other than "red," "blue," or "yellow," the program should display an error message. Otherwise, the program should display the name of the secondary color that results by mixing two primary colors.

3. The flowchart given below shows a simplified flowchart for troubleshooting a bad Wi-Fi connection. Use the flowchart to create a program that leads a person through the steps of fixing a bad Wi-Fi connection. Here is an example of the program's output:

```
Reboot the computer and try to connect.
Did that fix the problem? no Enter
Reboot the router and try to connect.
Did that fix the problem? yes Enter
```

   Notice the program ends as soon as a solution is found to the problem. Here is another example of the program's output:

```
Reboot the computer and try to connect.
Did that fix the problem? no Enter
Reboot the router and try to connect.
Did that fix the problem? no Enter
Make sure the cables between the router and modem are plugged in firmly.
Did that fix the problem? no Enter
Move the router to a new location.
Did that fix the problem? no Enter
Get a new router.
```



4. Write a program that uses a loop and a ternary (aka conditional) operator to display the characters for the ASCII codes 48 through 122. Display 16 characters on each line.

5. Running on a particular treadmill you burn 3.6 calories per minute. Write a program that uses a loop to display the number of calories burned after 5, 10, 15, 20, 25, and 30 minutes.

6. A teacher has asked all her students to line up according to their first name. For example, in one class Amy will be at the front of the line, and Yolanda will be at the end. Write a program that prompts the user to enter the number of students in the class, then loops to read that many names. Once all the names have been read, it reports which student would be at the front of the line and which one would be at the end of the line. You may assume that no two students have the same name.
   Input Validation: Do not accept a number less than 1 or greater than 25 for the number of students.

7. Write a program that generates a random number and asks the user to guess what the number is. If the user's guess is higher than the random number, the program should display "Too high, try again." If the user's guess is lower than the random number, the program

should display “Too low, try again.” The program should use a loop that repeats until the user correctly guesses the random number.

8. Self-Created Challenge:

   In this section, you need to create and solve one problem yourself based on the theme of this lab 04. The type of your self-created question and topics should be aligned with this lab, for example, this lab is mainly about control structures, i.e., selection statements, logical operators and loops.

   Try to generate a question which demonstrates/expects efficient use of the required topics studied in this lab. Innovative and interesting ideas would really be appreciated.

   Note: include the complete problem statement at the top of this .cpp program as comments.