

Please read 5.8 – 5.15, and Chapter 6 of the textbook and then answer the following, trying not to look at your notes or at the textbook. Quiz #5, on Thursday 12th April, will consist of questions taken or inspired from the Part I of this homework and from the lab. Project #4, presented in Part II, is due Thursday 22nd March, 2018, before 11:59 PM.

Part I — Questions

1. What will be displayed at the screen by the following program?

```
int counter = 2;
while (counter != 5)
{
    Console.Write(counter + "\n");
    counter++;
}
```

2. What will be displayed at the screen by the following program?

```
int counter = 10;
while (counter != 5) ;
Console.Write(counter + "\n");
counter--;
```

3. What will be displayed at the screen by the following program?

```
int counter = 7;
while (counter != 2)
Console.Write(counter + "\n");
counter--;
```

4. What is input validation? Name a control structure that can be used to perform it. Why is it important?

5. What will be displayed at the screen by the following program?

```
int myCounter = 7;
do
{
    Console.WriteLine(myCounter);
    myCounter++;
} while (myCounter != 12);
```

6. What will be displayed at the screen by the following program?

```
int t = 3;
do
{
    Console.WriteLine(t);
    t *= 2;
} while (t != 24);
```

7. What will be displayed at the screen by the following program?

```
for (int num = 3 ; num <= 5 ; num++)  
    Console.Write(num + " ");
```

8. Write a **for** loop that display at the screen the sequence “1, 2, 3, 4, 5, 6, 7, 8, 9, 10, ”.

9. Adapt the code from Exercise 8 so that the same sequence will be displayed at the screen, but *without the last comma*.

10. Write a **for** loop that display at the screen the sequence “1 3 5 7 9”.

11. What do we name a variable that is incremented at every iteration of a loop, i.e., that keeps the running total?

12. What is a sentinel value?

13. Consider the following code:

```
for (int y = 1; y <= 3; y++)  
{  
    for (int z = 1; z < 5; z++)  
        Console.Write("Scene " + y + ", take " + z + ". " );  
    Console.WriteLine();  
}
```

How many times does the outer loop iterates (i.e., how many scenes are shot)? How many times does the inner loop iterates (i.e., how many takes for each scene)? Finally, what is the total number of iteration of the nested loops (i.e., how many takes are made)?

14. Circle the pretest loops:

do while switch while for if-else-if

15. How many times would “Hi!” be printed?

```
bool flag = false;  
do  
{  
    Console.WriteLine("Hi!");  
} while (flag);
```

16. Can the body of a pretest loop be executed 0 times?

17. Convert the following **while** loop into a **for** loop.

```
int k = 0;  
while(k < 10)  
{  
    Console.WriteLine(k );  
    k++;  
}
```

Part II — Programming Exercises

For the fourth project,

1. Pick one of the problem below (courtesy of Dr. Dowell).
2. Solve it.
3. Share the code with me in any way you like: email, box, on paper, by mail, etc. Sharing only the source code and not the whole project is fine, but remember to write your name and the date in a delimited comment at the beginning of the source code. Just make sure I have access to your project before **03/22, 11:59 PM**.
4. As always, partial feedback is possible, but be careful: you have only one week to complete this project!

See Listings 1 and 2 for examples of execution (where the user input is underlined, and hitting carriage return is represented by ↵), and Lab 18 (<http://spots.augusta.edu/caubert/teaching/2018/spring/csci1301/lab/18/>) for some guidance.

Problem 1

In this problem, you will implement a newspaper vending machine that accepts only coins. A newspaper costs \$0.60. The vending machine accepts only **Nickels** (=\$0.05), **Dimes** (=\$0.10) and **Quarters** (=\$0.25). Your program should ask the user to enter a coin, and as long as the amount entered so far is less than the price of the newspaper, your program should loop and ask the user to enter another coin. The total entered so far should be displayed after each coin has been inserted. Once the user entered \$0.60 or more, you should display a message saying that the newspaper was delivered, and return the change if there is any.

Once you implemented the previous functionalities, add two features:

- The possibility for the user to type in lower-case or upper-case letters.
- The possibility at every step for the user not to insert any new coin, and to get his/her money back.

Problem 2

Write a program that plays **rock, paper, scissors**. In this game, the computer and the player secretly chose between rock, paper and scissors, and reveal their choice: rock beats scissors ; scissors beats paper ; paper beats rock ; and all the remaining cases are ties. The player enters a single character P, R or S (or Q to quit), and the program should display what the computer played, and the number of wins, losses, and ties.

Once you implemented the previous functionalities, add the possibility for the user to type in lower-case or upper-case letters.

You will need to use the Random class to generate random numbers. Observe and re-use the following code to complete your program:

```
Random myRandomObject = new Random();    // Instantiate the Random class.
int a, i = 0;
while (i <= 100)
{
    a = myRandomObject.Next(1, 11); // Generate a random number between 1 and 10, and
    ↵ assign it to a.
    Console.WriteLine(a + " ");      // Display the value of a.
    i++;                             // Increment the counter.
}
```



```
Please insert a coin (Nickel, Dime, Quarter) or exit (with e).
n ↵
Your total so far is $0.05.
Please insert a coin (Nickel, Dime, Quarter) or exit (with e).
N ↵
Your total so far is $0.10.
Please insert a coin (Nickel, Dime, Quarter) or exit (with e).
D ↵
Your total so far is $0.20.
Please insert a coin (Nickel, Dime, Quarter) or exit (with e).
d ↵
Your total so far is $0.30.
Please insert a coin (Nickel, Dime, Quarter) or exit (with e).
Q ↵
Your total so far is $0.55.
Please insert a coin (Nickel, Dime, Quarter) or exit (with e).
p ↵
Sorry, I didn't get that.
Your total so far is $0.55.
Please insert a coin (Nickel, Dime, Quarter) or exit (with e).
q ↵
Your total so far is $0.80.
Here is your newspaper.
Here is your change: $0.20.
Press any key to continue . . .
```

Listing 1: An Example of Execution For Problem #1

```
Welcome.
Enter R, P, S, or Q to quit.
S ↵
The computer played paper.
t : 0, w: 1, l: 0
Enter R, P, S, or Q to quit.
p ↵
The computer played rock.
t : 0, w: 2, l: 0
Enter R, P, S, or Q to quit.
R ↵
The computer played rock.
t : 1, w: 2, l: 0
Enter R, P, S, or Q to quit.
q ↵
Bie!
Press any key to continue . . .
```

Listing 2: An Example of Execution For Problem #2