



Assignments 5: Chapter 5 - Control Structures II (Repetition)

Total Points: 100; **and Deadline:** February/21/2023, 11:59 PM.

Note – Cheating and Plagiarism: Cheating and plagiarism are not permitted in any form and cause certain penalties. The instructor reserves the right to fail culprits.

Deliverable: All your responses to the assignment questions should be included in a single compressed file to be uploaded to the Gannon University (GU) – Blackboard Learn environment.

Important: Read the **Chapter 5** of your textbook, which is available in the GU – Blackboard Learn environment, **before** working on your assignments.

Question 1 (10 pts.). Mark the following statements as **True** or **False**.

- A. A loop is a control structure that causes certain statements to execute over and over.
- B. In a counter-controlled while loop, it is not necessary to initialize the loop control variable.
- C. A sentinel-controlled while loop is an event-controlled while loop whose termination depends on a special value.
- D. Executing a break statement in the body of a loop immediately terminates the loop.
- E. A flag-controlled while loop can use any type of variable to control the loop.

Question 2 (10 pts.). Suppose that the input is **0 5 6 4 9 8 -1**. Provide the output of the following code with a brief explanation.

```
int num = 0;
int sum;
cin >> sum;
while (num != -1)
{
    cin >> num;
    sum = sum + 2 * static_cast<int>(sqrt(num));
}
cout << "Sum = " << sum << endl;
```

Question 3 (10 pts.). Provide the output of the following code with a brief explanation. Rewrite the code using a “**for loop**” statement.

```
int i = 0, value = 0;
while (i <= 20)
{
    if (i % 2 == 0 && i <= 10)
        value = value + i * i;
    else if (i % 2 == 0 && i > 10)
        value = value + i;
    else
```

```

    value = value - i;
    i = i + 1;
}
cout << "value = " << value << endl;

```

Question 4 (10 pts.). Provide the output of the following code. If the “**break;**” statement in this code is changed to “**continue;**” statement, then specify the output. Provide a brief explanation for both cases.

```

int num = 12;
while (num >= 0)
{
    if (num % 5 == 0)
        break;
    cout << num << " ";
    num = num - 2;
}
cout << endl;

```

Question 5 (10 pts.). Students at a local middle school volunteered to sell fresh baked cookies to raise funds to increase the number of computers for the computer laboratory. Each student reported the number of boxes she/he sold. Write a program using a repetition structure with a brief explanation that will output the total number of boxes of cookies sold, the total revenue generated by selling the cookies, and the average number of boxes sold by each student. The data provided is in the following format: “**studentName numOf BoxesSold**”.

Question 6 (10 pts.). Write a program using a repetition structure with a brief explanation that reads the letter codes **A** to **Z** and prints the corresponding telephone digit. The program should use a sentinel-controlled while loop. To stop the program, the user should be prompted for the sentinel, which is the number sign character, **#**.

Question 7 (15 pts.). Suppose you are given a file consisting of students’ names and their test scores, which each score is a number between 0 and 100 (inclusive). Each line in the file consists of a student name followed by the test score. Write a program using a repetition structure with a brief explanation that outputs each student’s name followed by the test score followed by the letter grade. The program also needs to output the average test score for the class.

Question 8 (10 pts.). Write a program using the repetition structure of “**for loop**” with a brief explanation to create the following multiplication table.

```

1 2 3 4 5 6 7 8 9 10
2 4 6 8 10 12 14 16 18 20
3 6 9 12 15 18 21 24 27 30
4 8 12 16 20 24 28 32 36 40
5 10 15 20 25 30 35 40 45 50

```

Question 9 (15 pts.). Write a program using a repetition structure with a brief explanation that prompts the user to input an integer and then outputs both the individual digits of the number and the sum of the digits with visible separations. For example, it should output the individual digits of 3456 as **3 4 5 6**.