Final Exam Date

Monday May 10th , 2021 @ 8:00 am

Please Note that :

- **You must take the exam. No excuses will be accepted. I will not give a makeup exam regardless of the reason and a grade of zero will be assigned.**
- **Must have reliable internet service / Connection.**
- **You must log in with your net ID.**
- **When taking the exam, you must log in Zoom and you must have the camera on throughout the entire exam until you are done with your exam.**
- **Must leave the zoom session as soon as you are done with the exam.**
- **Exam is open notes only. You are not allowed to use any other resources such as the internet or Code::Blocks or any other IDE.**
- **Questions are given thru Canvas. You must answer the questions and submit your solution thru Canvas as well.**
- **Questions are shuffled and you will not be able to go back to your answered questions.**
- **Questions are T/F , multiple choice , conceptual and writing programs**

- **You will get a zero if any of the above was violated.**

True/False.

1. The final output of the process of compilation of source code is an executable image (.exe) file.
2. In a computer language, syntax refers to the rules of grammar of the language.
3. Global variables are declared inside main(), at the very beginning.
4. The scope of a variable is the code block surrounding the variable.
5. Under some circumstances, the body of a while loop may never execute.

- **What is the output of the following?**

```
      cout << "2 % 3 = " << 2 % 3 << endl;
```

- **Given the following definitions,**

```
int i = 3;          int j = 13;      int k = 30;      int test = 0;
```

What is the value of the following expression?

```
         (i != j) && (((i > 5) || (j < 10)) && test)
```

- **Assume that**

```
      (x > 0) is true  ,  (x < 0) is false  ,  (x != 0) is true

      (x >= 0) is true  ,  (x != 1) is false  , (x == 1) is true
```

- **What are the outputs of the following?**

```
(true) && (3 > 4)  =====

!(x > 0) && (x > 0)     =====

(x > 0) || (x < 0)   =====

(x != 0) || (x == 0)     =======

(x >= 0) || (x < 0)      =====

(x != 1) == !(x == 1)    =====
```

- **given the following code :**

```
(count % 10 == 0) ? (cout << count << "\n") : (cout << count << " \t");
```

what will be displayed if count has value of 50 and then 55

- **What is the output of the following?**

```
char choose = 'b';
switch (choose)
{
      case 'a':
      case 'A':
            cout << "you win!\n";
      case 'b':
      case 'B':
            cout << "you lose!\n";
      case 'c':
      case 'C':
            cout << "you draw!\n";
      default:
            cout << "I don't know you!\n";
}
```

- **How many times does each loop execute?**

```
a.   for (i = 0; i <= 100; i++) {   robot.translate(1);     }
```

```
b.    for (i = 1; i < 100; i++) {   robot.translate(1);  }
```

- **What ist he output of the following**

```
int sum = 0;   int number = 0;
while (number < 15 && sum < 50)
        {         number++;
                  sum += number;              }

cout << "The number is " << number << endl;
cout << "The sum is " << sum << endl;
```

- **What is wrong with the if statement listed below, and rewrite it to fix that logical error.**

```
if ((gpa >= 2.3) && (gpa < 3.0))
   cout << "Your GPA is not bad but you should improve it.";
if ((gpa >= 3) && (gpa <= 3.7) )
   cout << "You got a pretty good GPA";
cout << "Congratulations. You made the Dean's list";
```

- **What is the output of the following**

```
int numbers[10];
int i, index = 2;

for (i = 0; i < 10; i++)
        numbers[i] = i * 10;

numbers[8] = 25;
numbers[5] = numbers[9] / 3;
numbers[4] += numbers[2] / numbers[1];
numbers[index] = 5;
++numbers[index];
numbers[numbers[index++]] = 100;
numbers[index] = numbers[numbers[index + 1] / 7]--;

for (index = 0; index < 10; index++)
        cout << "numbers[ " << index << " ] = " << numbers[index] << endl;
```

- **Refer to the following program :**

```
        void modifyArray(int ARR[],int size);

        int main()
        {
                int A[4];
                modifyArray(A,4);

                return 0;
        }
        void modifyArray(int ARR[],int size)
        {
                for (int i = 0; i < 4; i++)
                        if ( i % 2 == 0)
                                ARR[i] = 2 * i;
                  else
                          ARR[i] = i;       }
```

- **Write a code that produces the following**

```
1G
1G3G
1G3G5G
1G3G5G7G
1G3G5G7G9G
```

What is the output of the following program?

```
#include<iostream>
using namespace std;
int i = 7;
int main()
{
   int i;
   i = 5;
   while (i != 5)
      {int j, i;
       j = 1;i = 0;
       switch (i) {
          int i;
          case 1:if (i != 4) {
             int k, i;
             i = -1;
             j = 6;
             k = 2;
             }    break;
           case 2:
              j = 5;   break;
              }
      cout <<"j = "  <<  j << ' ';
      }
   cout << "i =   " <<i << endl;
   cout << "i =   " <<  ::i << endl;
return 0;
}
```

- Trace the program , show the **exact** output .

```
#include<iostream>
using namespace std;

void foo1(double  x, double &y)   {
      x = y*2;
      y = 2;              }

void foo2(double &x, double y)   {
      x = -1;
      y = -2;             }

void foo3(double &x, double &y)  {
      x = 3;
      y = 5;          }

int main(void)   {
      double x = 2;
      double y = 3;
      foo1(x, y);
      cout << "IN  main - After foo1 x = " << x << ", y = " << y << endl;  //  1  pt
      foo2(x, y);
      cout << "IN  main - After foo2 x = " << x << ", y = " << y << endl;  //  1  pt
      foo3(x, y);
      cout << "IN  main - After foo3 x = " << x << ", y = " << y << endl;  //  1  pt
  return 0;
}
```

- Write a **function** that takes one character as input and prints out that character plus the next five characters, separated by tabs. The function takes one char argument, and returns a char.

For example, if the value of the argument passed to the function was 'm', then the function would print:

```
    m    n    o    p    q    r
```

and return 'r'.

Assume that your version of C++ uses ASCII code to represent characters (a safe assumption), so you can use the following “trick“, mixing int and char types: **the expression `('a' + 1)` returns `'b'`**

and so on for all alphabetical (and numerical) characters.

Show separately the function **declaration**, the function **definition,** and a sample function **invocation**.

- **Consider the following program.**

```
include <iostream>

void Sum(int a, int b, int & c)
{
     a = b + c;
     b = a + c;
     c = a + b;
}

int main()
{
     int x=2, y=3;

     Sum(x, y, y);
     cout << x << " " << y << endl;
     return 0;
}
```

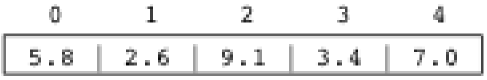
- What happens when this program is compiled and executed?

A. There is a compile-time error because in the call *Sum(x, y, y)*, variable *y* is passed both by value and by reference.
B. There is a run-time error because in the call *Sum(x, y, y)*, variable *y* is passed both by value and by reference.
C. The program compiles and executes without error. The output is: 2 3
D. The program compiles and executes without error. The output is: 6 9
E. The program compiles and executes without error. The output is: 2 15

- **Write a function named "rotate_right" that takes as its arguments the following:**

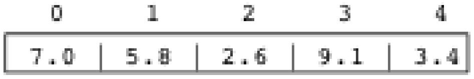
  (1) an array of floating-point values;
  (2) an integer that tells the number of cells in the array;

The function should shift the contents of each cell one place to the right, except for the contents of the last cell, which should be moved into the cell with subscript 0 . Thus, for example, if the array passed to the function looks like this:



0	1	2	3	4
5.8	2.6	9.1	3.4	7.0

then when the function returns, the array will have been changed so that it looks like this:



0	1	2	3	4
7.0	5.8	2.6	9.1	3.4

The function should not return a value.

Write a program that reads student's name followed by 2 test scores. The program should output each students's name followed by test scores and the average. Student data should be stored in a structure variable of type stClass which has three componnents : studentNameof tyoe string , exam1 of type integer , and exam2 of type integer. Suppose that the clas has 20 students. Use an array of 20 components of the type stClass.

- Assume the following structure definition :

```
struct box {
        char maker[40];
        float height;
        float width;
        float length;
        float volume;
        };
```

1. Create reeses variable of type box structure.
2. Initialize the reeses variable with the following values :
   Hershey , 2.2 , 3.5 , 7.5
3. Write a function that accepts the box structure variable reeses and that displays the value of the structure's member variables on the screen.
4. Write a function that accepts the address of the box structure variable reeses and that sets the volume member to the product of the other three dimensions.
5. Write a simple program that uses these two functions.