Q1. True / False and Multiple Choice [15 points, 5 each]

Write your answers on the exam paper.

1.a.
Determine whether the following statement is **true or false**. If you select false, briefly state **why.**

Given the code snippet:

```
#ifdef VERBOSE
cout << "Performing iteration number " << j << endl;
#endif
```

The cout statement is compiled in the code only if VERBOSE was defined earlier in the program.

True

1.b.
Consider the following code:

```
void foo(int x, int &y, char* z) {
      int array = new int[5];
      static int st=1;
      char c = 'A';
      for (int i=0; i<x; i++) {
            st += y;
      }
}
```

Which of the following would definitely be stored on the stack? Choose one or more of the multiple choices.

i. x ✓
ii. y ✓ Address of y is stored in the stack - y itself could be on the heap
iii. z
iv. array
v. st
vi. c ✓

1.c.

Determine whether the following statement is **true or false**. If you say false, briefly state **why.**

The following C++ program

```
int main() {
      for (int j=0; j < 5; j++) {
            cout << j << endl;
      }
      return 0;
}
```

False :
- j starts from 0
- j ends before 5 happens
- maybe we need to do imports

Will print the following output in the terminal:

1
2
3
4
5

Q2. Short Answers [15 points, 5 each]

Write your answers on the paper exam.

2.a.

Consider the following Simplified Intel Assembly code. What value would be stored in memory location 20 after the execution of the code is complete?

This code uses the Simplified Intel Assembly we covered in class (available online during the exam).

```
      mov R0, 7
      mov R1, 5
      mov R2, 0
      mov R3, 0
loop: cmp R1, R2
      je end
      inc R2
      add R3, R0
      jmp loop
end:  inc R3
      mov R4, 20
      mov [R4], R3
      halt
```

36

2.b.

Convert the following decimal number into hexadecimal and the hexadecimal number into decimal. Show your work when providing the solution (i.e., the steps you followed to get to the results).

k. 0x0F2A (convert to decimal)

3882

ii. 287 (convert to hexadecimal)

11F

2.c.
Consider the following code snippet running on a 32-bit machine:

```
int value = 5;
int* p = &value;
cout<< p <<endl;  //prints out 0x7fff560b
```

For the following statements, provide the values of value, **p,* and *p* after executing the statement. Before each of the statements execute, assume the following initialization is repeated.

```
value= 5;
p = &value;
```

	value	*p	p
i. `value += 2;`	7	7	0x7fff560b
ii. `*p++;`	6	6	0x7fff560b
iii. `++p;`	5	junk	0x7fff560f
iv. `*p = value + p;`	junk	junk	0x7fff560b

** You can write "unknown" if the value at a particular address or an address is not known.*

Q3. Functions, Arrays, Loops [15 points]

Files to submit: *Q3.cpp*

Write C++ code implementing the following function.

Submit only the cpp file for the function. Do NOT submit the main function or the header file. You can find the header file on Blackboard (Q3.h), along with a sample main (Q3main.cpp).

Your code (when compiled with appropriate test code and the necessary standard libraries) needs to compile in order to receive any partial credit.

Write a function `printEven` that given an array of integers, prints on the screen the elements of that array that are even, as follows:

```
void printEven(int numbers[ ], int numsize);
```