**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Score:\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**ECE 2036 Test 1**

Open book and notes, PCs and tablets allowed, but no Internet Access and code cannot be run on a PC

1. (*5%)* Fill in the typical size (per textbook and slides) in bytes of the following C/C++ variable types:

char \_\_*1*\_\_\_ bytes int \_\_\_*4*\_\_\_bytes double\_\_*8\_*\_\_ bytes

int array[n] \_\_\_*4n*\_\_\_\_\_ bytes String with n characters \_\_\_*n+1*\_\_\_\_ bytes

1. (*5%)* Write a simple C/C++ statement below that would generate a “pseudo” random number between 1 and 100.

*1 + rand % 100*

1. (*5%)* What would need to be added to fix compile errors if you left out the “using namespace std;” statement in most C/C++ programs that use “cout” and “cin” ?

*Add std:: to cin and cout i.e., std::cout and std::cin*

1. (*5%)* A \_\_\_\_\_\_\_*stack*\_\_\_\_\_\_ is a common memory structure that enables recursion. It is used automatically by compilers to store subroutine or function return addresses along with any local variables.
2. (*5%)* Write a C/C++ for statement using an integer variable “i” starting at zero that would execute a block of code exactly 1000 times.

*for (i=0; i<1000; i++) {*

*//code block to repeat*

 *}*

1. (*5%)* The \_\_\_\_*template*\_\_\_\_ feature in C++ can be used to automatically generate functions or classes that include different types.
2. (*5%)* What happens if one case in the middle of a long switch statement does not end with “break;” ?

*falls through to next case*

1. (*5%)* What is the most common way in C/C++ to pass an entire 1D array as an argument to a function? For an example use “int array[10];” , assume the array size can change, and use “void func1()” as an example function. Show the function prototype and an example function call.

*void func1( int [], int size…….);*

*….*

*func1( array, 10);*

1. (*20%)* Write the output produced by this program exactly as it will appear on the output device.

*3 5*

*7 9*

*11 13*

*15 17*

#include <iostream>

using namespace std;

class test

{

public:

 test();

 void x(test y);

public:

 int w;

};

test::test(){

 w = 1;

}

void test::x(test y)

{

 w = y.w + 2 ;

}

int main(int argc, \_TCHAR\* argv[])

{

 test A;

 for (int i=1; i<9; i++){

 A.x(A);

 cout << A.w << " ";

 if (i%2==0) cout<< endl;

 }

}

1. (*25%)* Write the output that is produced by this C/C++ program.

*33953*

#include <iostream>

using namespace std;

int main(int argc, \_TCHAR\* argv[])

{

 int a[8]={1,2,3,4,5,6,7,8};

 int \*aptr;

 aptr = &a[0];

 a[2] = a[2] + 1;

 a[3] = a[3] + a[4];

 aptr++;

 (\*aptr)++;

 (\*(++aptr))--;

 cout << a[1] << a[2] << a[3] << a[4] << \*aptr << endl;

}

1. (*15%)* Describe in detail exactly what you would see when the following C/C++ program is run on the mbed module. Include elapsed time in your answer.

*The LEDs will count up two times per second in binary from 1 to 15 and stop at 15(all LEDs on).*

#include "mbed.h"

DigitalOut a(LED1);

DigitalOut b(LED2);

DigitalOut c(LED3);

DigitalOut d(LED4);

void sub1(int j)

{

 d = j % 2;

 c = (j >> 1) % 2;

 b = (j >> 2) % 2;

 a = (j >> 3) % 2;

}

void sub2(int \*k)

{

 if (\*k < 15)

 (\*k)++;

 sub1(\*k);

}

int main()

{

 int i=0;

 while(1) {

 sub2(&i);

 wait(0.5);

 }

}