Introduction to Computing
CS 151
Department of Physics and Computer Science
Medgar Evers College
Exam 1

Direction: Submit your typed work(s) as an upload(s) to the Exams directory of your GitHub repository or Dropbox, or in your Exam01 google classroom assignment.

Section	Maximum Points	Points Earned
Fundamentals	5	
Problem Solving	5	
Tracing	5	
Debugging	5	
Total	20	

Fundamentals

1. **For each of the following questions, write ONLY what is requested.**

   a. Write a statement(s) that initializes the variables named h, i, j and k to `'t'`, `"two"`, 67, and false respectively.

   b. Write a statement(s) that prompts the user to enter their name and stores it in a variable.

   c. Write a statement(s) that displays a rectangle of asterisks that is 5 asterisks high and 9 asterisks wide.

   d. Given the string variable t that has been initialized, write a statement(s) that assigns the concatenation of t with itself three times enclosed in two sets of parentheses to another variable.

   e. Given the int variable n that has been initialized, write a statement(s) that displays the remainder of the sum of four consecutive integers ending with n divided by 3.

Problem Solving

2. **Write a COMPLETE program that can evaluate the composite function $h(g(f(x)))$ where $h(x) = 5x^2 + 2x - 7$, $g(x) = 4x^2 - 12x + 9$ and $f(x) = 2x^3 - 6x^2$ for any real number. The composition function $h(g(f(x)))$ implies that you evaluate $h(x)$ at the solution of $g(x)$ that is evaluated at the solution of $f(x)$ evaluated at x. The program should prompt the user for a value for x [display a message and read in data], and then, display the result of the composition of $h(g(f(x)))$ preceded by the string `"h(g(f(x))) = "`. For instances, if the user enters 3 for x, then the program will display `"h(g(f(x))) = 416"`.**

Tracing

3. **Generate the trace table or trace table list of the main function below using inputs ('e', 'a', 's', 'y'). Remember the alphabet in ascii is in alphabetical order.**

```
int main()
{
 char a1, a2, a3, a4;
 int n;

 cout << "Enter four letters:";
 cin >> a1;
 cin >> a2;
 cin >> a3;
 cin >> a4;

 n = a1 - 'a';
 n = (n * 3) % 26;
 n = (n + 11) % 26;
 a1 = 'a' + n;
 n = a2 - 'a';
 n = (n * 3) % 26;
 n = (n + 11) % 26;
 a2 = 'a' + n;
 n = a3 - 'a';
 n = (n * 3) % 26;
 n = (n + 11) % 26;
 a3 = 'a' + n;
 n = a4 - 'a';
 n = (n * 3) % 26;
 n = (n + 11) % 26;
 a4 = 'a' + n;

 cout << a1 << a2 << a3 << a4 << "\n";
 return 0;
}
```

Debugging

4. **Write ONLY the line number and its correction for each line that has a syntax error in the code below.**

```
01 | #include (iostream)
02 | using namespace std;
03 |
04 | int main()
05 | }
06 |  int x, y;
07 |  cin << x;
08 |
09 |  Y = 2 * x * x;
10 |  cout << "(" << x << ',' << y << ")\n";
11 |  int z = x + y;
12 |  cout >> z;
13 |  x = y * x / 2;
14 |  3 * y - 7 = y;
15 |  cout << "\n(" << x << "," << y << ")\n";
16 |  z = "x - y";
17 |  cout << z << '\n';
18 |  cin >> 'x';
19 |  cin >> y;
20 |
21 |  z = (x + y) % 7.5;
22 |  cout << '(' << x << "," << y;
23 |  cout << ")\n z";
24 |  Return 0;
25 | }
```