



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

- For each of the following questions, write **ONLY** what is requested.
 - Write a statement(s) that initializes the variables named *a*, *b*, *c* and *d* to 12.5, 't', true and "one" respectively.
 - Write a statement(s) that prompts the user to enter their height in inches and stores it in a variable.
 - Write a statement(s) that displays a rectangle of asterisks that is 3 asterisks high and 7 asterisks wide.
 - Given the string variable *s* that has been initialized, write a statement(s) that assigns the concatenation of *s* with itself four times enclosed in square brackets to another variable.
 - Given the int variable *n* that has been initialized, write a statement(s) that displays the remainder of the sum of four consecutive integers starting with *n* divided by 3.

Problem Solving

- Write a **COMPLETE** program that can evaluate the composite function $h(g(f(x)))$ where $h(x) = 4x^3 - 7x$, $g(x) = 2x^2 - 5x$ and $f(x) = x^2 - 4x + 4$ 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 " $h(g(f(x))) = -87$ ".

Tracing

3. Generate the trace table or trace table list of the main function below using inputs ('r', 'a', 't', 'e'). 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 * 5) % 26;
    n = (n + 8) % 26;
    a1 = 'a' + n;
    n = a2 - 'a';
    n = (n * 5) % 26;
    n = (n + 8) % 26;
    a2 = 'a' + n;
    n = a3 - 'a';
    n = (n * 5) % 26;
    n = (n + 8) % 26;
    a3 = 'a' + n;
    n = a4 - 'a';
    n = (n * 5) % 26;
    n = (n + 8) % 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 | {
```