

Name: Dylan McDonaldSection: n

CS 54 Lab 07 Part IV

Consider the following structure:

```
struct building
{
    int m_numFloors;
    double m_floorSpace;
    bool m_hasAnthrax;
};
building myBuilding;
```

1) Write a statement that will output “PANIC! Building is under attack!” if `myBuilding` has anthrax and “Just kidding! It was only powdered sugar.” if not ($\frac{1}{2}$ point).

```
if (myBuilding.m_hasAnthrax)
    cout << "PANIC! Building is under attack!" << endl;
else
    cout << "Just kidding! It was only powdered sugar." << endl;
```

2) Write a function `double ripOffRent(building &myBuilding, int floorLevel)` that calculates rent, r , based on the following formula:

$$r = \frac{s \cdot \ell}{n - \ell}$$

where ℓ is the floor level they’re at, n is the number of floors, and s is the floor space in the building ($\frac{3}{2}$ points).

```
double ripOffRent(building &myBuilding, int floorLevel)
{
    double rent;
    rent = (myBuilding.m_floorSpace * floorLevel) / (myBuilding.m_numFloors - floorLevel);
    return rent;
}
```

(As an aside, why did nobody point out that my formula divides by zero if $n = \ell$?)

Consider the following two arrays:

```
double cs54grades[30];
building lowerManhattan[100];
```

3) Write a statement that will access the 7th CS 54 Grade ($\frac{1}{2}$ point).

```
cout << cs54grades[6] << endl;
```

4) What bug(s) can you find in the following statements (1 point):

```
double netSpace = 0.0;
for (int i = 0; i <= 100; i++)
{
    netSpace += lowerManhattan.m_floorSpace;
}
```

2 bugs:

- `i <= 100` walks off the array; it should be either `i < 100` or `i <= 99`.
- The line in the for loop doesn't reference which building it is. It should be:
`netSpace += lowerManhattan[i].m_floorSpace;`

5) Write statements that will find the arithmetic mean of the CS 54 grades. Remember the formula for the arithmetic mean of n objects is:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

HINT: Don't forget C++ indexes arrays from 0, not from 1 (as mathematicians do) ($\frac{3}{2}$ points).

```
double mean, netGrades = 0.0;
for (int i = 0; i < 30; i++)
{
    netGrades += cs54grades[i];
}
mean = netGrades / 30.0;
```