Problem 1. (25 points, 5 points each) Short answers.

(1) What is the output of the following block of C++ code?

```
Int i = 0;
while (i <=3) {
      cout << "hi!"<<endl;
      i++;
}
cout << "bye!"<<endl;
```

Output:

hi!
hi!
hi!
hi!
bye!

(2) What is the output of the following block of C++ code?

```
int x = 3;
int i = 0;
while (i < 3) {
   x += 1;
   i += 1;
}
cout << x << endl;
```

Output:

6

(3) What is the output for the following code segment?

```
int k = 5;
int i = -2;
while (i <= k) {
   i = i + 2;
   k--;
   cout << (i + k) << endl;
}
```

Output:
4
5
6

(4) What is the output of the following code segment?

```
int i = 0;
char letter = 'a';
while (i < 3) {
   cout << letter << endl;
   Letter ++;
   I++;
}
```

Output:
a
b
c

(5) What is the output of the following block of C++ code?

```
int myNum = 10;
int guess = 3;
bool correct = false;
while(!correct)
{
     cout << guess << "?" << endl;
     if(guess == myNum){
        cout << "That's Right!" << endl;
        correct = true;
     }
     else if(guess < myNum){
        cout << "Higher!" << endl;
        guess *= 2;
     }
     else{
        cout << "Lower!" << endl;
        --guess;
     }
}
```

```
Output:
3?
Higher!
6?
Higher!
12?
Lower!
11?
Lower!
10?
That's Right!
```

Problem 2. (25 points)
Please write a C++ program that (1) asks the user to input an integer (2) checks if the number is a positive even number, if not, asks the user to input another integer, checks again, until a correct input was entered. (3) displays the positive even integer.

No write-up is required for this problem.
Please submit your .cpp file as "yourLastName_hw4_prob2.cpp".

Problem 3.
(25 points)
Write a C++ program to estimate PI using the Monte Carlo method. Your program should ask the user to input the total number of random points (xi, yi) we will generate in the simulation

Report the difference between your estimated PI value and PI= 3.14159265 when you use 10^2, 10^3, 10^4, 10^5, 10^6 and 10^7 samples in the write-up.
Please submit your .cpp file as "yourLastName_hw4_prob3.cpp".
Differences:
At 10^2 difference is 0.0615927
At 10^3 difference is 0.0335927
At 10^4 difference is 0.0244073
At 10^5 difference is 0.00407265
At 10^6 difference is 0.00199665
At 10^7 difference is 0.00033335

Problem 4. (25 points)
Please write a C++ program that (1) reads numbers from the input text file "dat_hw4_prob4.txt" one at a time (2) computes the average of all numbers (3) finds the largest number (4) displays the results on your screen. You may assume the file contains at least one number.

Please report your results in the write-up.
Please submit your .cpp file as "yourLastName_hw4_prob4.cpp".

Output:
File Opened Successfully!
The list of numbers in this file is:
-21.5
0.4
0.6
0.5
30.4
1.55
2.5
3.5
2.7
10.4
13.5
29.1
-7.5
8.7
28.6
15.8
-20.5
7.6
16.8
17.63
26.85
32.84
15.87
The largest number in the set is 32.84
There are 23 number values in the file
The sum of these numbers is 253.71 and the average is 11.0309