Question 1.
Find the errors in the following pieces of code.

(a)
```cpp
#include <iostream>
using namespace std;
void myFunc(int x);
int main()
{
    int x, y;
    y = myFunc(int);
    cout << "x: " << x << " y: " << y << endl;
    return 0;
}
void myFunc(int x)
{
    return (4*x);
}
```

(b) int counter = 0;
while (counter < 10)
    cout << "counter: " << counter << endl;

(c) int counter = 100;
while (counter < 10)
{
    cout << "counter: " << counter << endl;
    counter--;
}

Question 2.
How often do the following loops execute? Assume that i is not changed in the loop body.

(a) for (i = 1; i <= 10; i++)...

(b) for (i = 0; i < 10; i++)...

(c) for (i = 10; i > 0; i--)... 

(d) for (i = -10; i <= 10; i++)...

(e) for (i = 10; i >= 0; i++)...

(f) for (i = -10; i <= 10; i = i + 2)...

(g) for (i = -10; i <= 10; i = i + 1)...
Question 3.
What are the values of \( s \) and \( n \) after the following pieces of code. Try to not use your computer!

(a) int \( s = 1; \)
    int \( n = 1; \)
    while (\( s < 10 \)) \( s = s + n; \)
    \( n++; \)

(b) int \( s = 1; \)
    int \( n; \)
    for(\( n = 1; \) \( n < 5; \) \( n++ \)) \( s = s + n; \)

(c) int \( s = 1; \)
    int \( n = 1; \)
    do
    {
      \( s = s + n; \)
      \( n++; \)
    }
    while (\( s < 10 * n \));

Question 4.
Write a function called \texttt{harmonic} that calculates a floating point approximation of the \( n \)-th Harmonic number. Harmonic numbers show up in algorithm and probability analysis all the time. They are defined as follows:

\[
H_n = \sum_{i=1}^{n} \frac{1}{i}
\]

Think about what the input and outputs will be, ie., what will the types be? Also, think of how to calculate a sum (\textit{Hint:} Use a loop).