Step1:

Using language c to write a program that reads a given integer (N) and satisfies the following of a pythagorean triple which is a set of three integers such as a,b,c that form a right angled triangle using the formula a^2+b^2=c^2

- prints the total number of Pythagorean triples (a,b,c) with c <N,

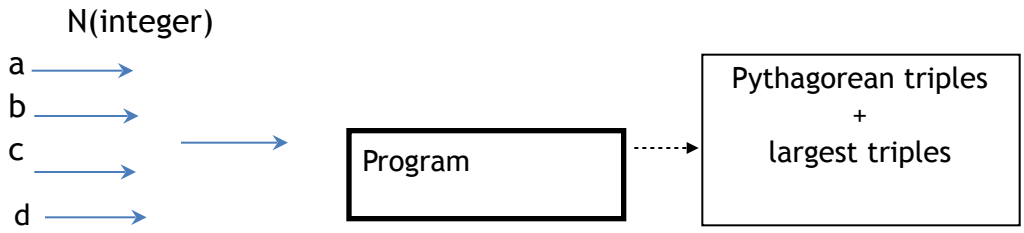
- all the possible Pythagorean triple

- the value of the triple that has the largest value of c

Step 2:

Input: The input is N (an integer)

Output: Total number of Pythagorean triples,all possible triples and the largest triple value of c



Test cases:

N	Triples	Largest triple
6	(3,4,5)	(3,4,5)
15	(3,4,5) (5,12,13) (6,8,10)	(5,12,13)
22	(3,4,5) (5,12,13) (6,8,10) (9,12,15) (12,16,20)	(12,16,20)

Step 3: Algorithm Design

Assign a value to the integer(N)

Initialize a,b,c number of triples to verify if true put into formula

If so, print the values of a,b,c(triples)

Counter++ once a pythagorean triple has been identified

Assign highest value of C

Print the largest triple

Step 4: C program attached separetly

Step 5: Verification of Test Cases

Test Case 1: Integer(N)=6

Output: The total number of Pythagorean triples are 1

The values of a,b,c are 3,4,5

The greatest int is 3,4,5 , this is accordingly to the test cases as expected

Test case 2: Integer(N)=15

Output: The total number of Pythagorean triples are 3

The values of a,b,c are (3,4,5), (5,12,13),(6,8,10)The greatest int is (5,12,13), this is accordingly to the test cases as expected

Test case 3: Integer(N)=22

Output: The total number of Pythagorean triples are 5

The values of a,b,c are (3,4,5),(5,12,13),(6,8,10),(9,12,15),(12,16,20)

The greatest int is (12,16,20), this is accordingly to the test cases as expected

The following program was executed correctly and fully functional

```
Print a positive integer value6
The total number of Pythagorean Triples are 1
a,b,c values are
,3,4,5
the greatest int is 3,4,5

Process returned 0 (0x0)   execution time : 2.492 s
Press ENTER to continue.
```

```
Last login: Sat Oct 17 12:20:21 on ttys000
Bashiers-MacBook-Pro:~ bashierahmed$
Bashiers-MacBook-Pro:~ bashierahmed$ /Users/bashierahmed/Downloads/CodeBlocks.ap
p/Contents/MacOS/cb_console_runner DYLD_LIBRARY_PATH=$DYLD_LIBRARY_PATH:. /Users
/bashierahmed/Desktop/Lab2.c/bin/Debug/Lab2
Print a positive integer value22
The total number of triples are in 6
a,b,c values are
,3,4,5
a,b,c values are
,6,8,10
a,b,c values are
,5,12,13
a,b,c values are
,9,12,15
a,b,c values are
,8,15,17
a,b,c values are
,12,16,20
the greatest int is 12,16,20

Process returned 0 (0x0)   execution time : 3.544 s
Press ENTER to continue.
```

```
Last login: Sun Oct 18 17:54:06 on ttys000
Bashiers-MacBook-Pro:~ bashierahmed$ /Users/bashierahmed/Downloads/CodeBlocks.ap
p/Contents/MacOS/cb_console_runner DYLD_LIBRARY_PATH=$DYLD_LIBRARY_PATH:. /Users
/bashierahmed/Desktop/Lab2.c/bin/Debug/Lab2
Print a positive integer value 15
The total number of Pythagorean Triples are 3
a,b,c values are
,3,4,5
a,b,c values are
,6,8,10
a,b,c values are
,5,12,13
the greatest int is 5,12,13

Process returned 0 (0x0)   execution time : 4.148 s
Press ENTER to continue.
```

Additional Pre Lab Questions

1. The following program executes in a way by telling the user to input 20 numbers comparing it to the max number that is -999 and tells the user to “enter a positive integer” for x. When that number is inputted, if it’s greater than the previous max assigned, it is now the new max value. It retells the user to input a value for the max, depending on if it’s greater than the previous max and on the number of count being less than 20, it will be assigned as the new maximum. This undergoes a recurring cycle and loop until the number count reaches above 20 and finds the greatest value the user inputted.

2. 0 0; 1; 2; 3; 4; 5;

1 1; 2; 3; 4; 5;

2 2; 3; 4; 5;

3 3; 4; 5;

4 4; 5;

5 5;

6

7