**3.Pythagorean Triple**

Problem Statement:

A Pythagorean triple is a triple (a, b, c) of positive integers with the property that

a2 + b2 = c2

Write a program that scans a positive integer value k and outputs all Pythagorean triples (a, b, c), with 0 < a ≤ b < c ≤ k.

• Input example :

1. 4
2. 47
3. 100

• Output example :

1. No Pythagorean triple available
2. Pythagorean triples are:

3 4 5

5 12 13

6 8 10

7 24 25

8 15 17

9 12 15

9 40 41

10 24 26

12 16 20

12 35 37

15 20 25

15 36 39

16 30 34

18 24 30

20 21 29

21 28 35

24 32 40

27 36 45

1. Pythagorean triples are:

3 4 5

5 12 13

6 8 10

7 24 25

8 15 17

9 12 15

9 40 41

10 24 26

11 60 61

12 16 20

12 35 37

13 84 85

14 48 50

15 20 25

15 36 39

16 30 34

16 63 65

18 24 30

18 80 82

20 21 29

20 48 52

21 28 35

21 72 75

24 32 40

24 45 51

24 70 74

25 60 65

27 36 45

28 45 53

28 96 100

30 40 50

30 72 78

32 60 68

33 44 55

33 56 65

35 84 91

36 48 60

36 77 85

39 52 65

39 80 89

40 42 58

40 75 85

42 56 70

45 60 75

48 55 73

48 64 80

51 68 85

54 72 90

57 76 95

60 63 87

60 80 100

65 72 97

Proposed C Code:

/\* ------- main.c ------- \*/

#include <stdio.h>

#include <math.h>

int main()

{

    int k;

    float c;

    printf("Enter the number ");

    scanf("%d", &k);

    if (k < 5)

    {

        printf("No Pythagorean triples available \n");

    }

    else

    {

        printf("Pythagorean triples are: \n");

    }

    for (int i = 1; i <= k; i++)

    {

        for (int j = i; j <= k; j++)

        {

            c = sqrt(i \* i + j \* j); *// finding the sqrt*

            if (c == (int)c && c <= k) *// if sqrt and it's integer value is same then print*

            {

                printf("%d %d %d \n", i, j, (int)c);

            }

        }

    }

    return 0;

}

/\* ---------------------- \*/

Conclusion:

The proposed algorithm has a runtime of O(n2) where n is the positive integer k.

Limitations and assumptions for this algorithm include:

1. In this program we only consider the integer value of k, so for any value of k which is above the range of integer this program will not work.