iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** VII **Month of publication:** July 2017

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue VII, July 2017- Available at www.ijraset.com

Computational Approach for Finding Pythagoras Hexagon (A, B, C, D, E, F), when One of A, B, C, D or E is Given and Hypotenuse F ≤ N, where N is a Natural Number

S.N.R.G. Bharat Iragavarapu[1], K. Kavya Reddy[2]
[1]*Department of Mathematics,* [2]*Department of Electronics and Communication Engineering*
[1,2]*GVP College of Engineering (Autonomous), Visakhapatnam, AP, India*

Abstract: ***In this paper, using computer programming C language, for any natural number n, we determine the Pythagoras hexagon (a, b, c, d, e, f) where f denotes the length of the hypotenuse and is ≤ n, when one of a, b, c, d or e is given thereby the number of such Pythagoras hexagon are also known.***
Keywords: ***Pythagoras theorem, hexagon, Pythagoras hexagon, natural numbers, programming language.***

I. INTRODUCTION

In [1, 2], we was find the remaining side lengths of the Pythagoras triangle and Pythagoras quadrilateral if one of the side length is known. Now in this paper, we exhibit all possible Pythagoras hexagons, knowing only one side length that is not an hypotenuse. For example, suppose we take the length of one side as 10 and the maximum limit n as 15 then all the possible Pythagoras hexagons are (2,2,2,3,10,11), (1,3,3,5,10,12), (2,2,6,9,10,15), (1,4,4,6,10,13) and (2,2,5,6,10,13) , (2,6,6,7,10,15), (3,4,6,8,10,15). Because the above all combinations satisfies extension of Pythagoras theorem. This process is very difficult if one side length is sufficiently large and n is also large. Now our aim is to find the number of Pythagoras hexagons using programming language.

II. MAIN RESULT

A. Algorithm

Step1: START.
Step2: Initialize a, b,y,d,e,z, l, s to zero.
Step-3: Initialize i, m, k, c ,h, p, i, j to zero.
Step-4: Display that to enter maximum limit of the length of Pythagoras Hexagon.
Step-5: Read the integer z from the keyboard.
Step-6: Display that to enter one side length of the Pythagoras hexagon(that is not an hypotenuse).
Step-7: Read the integer c from the keyboard.
Step-8: If z is less than c go to step-9 else step-10
Step-9: Display that the side length exceeds maximum limit.
Step-10: Assign c to h.
Step-11: Initialize i=1.
Step-12: If i less than or equal to z go to step-13 else go to step-25.
Step-13: Initialize m=1.
Step-14: If m less than or equal to i go to step-15 else go to step-25.
Step-15: Initialize p=1
Step-16:If p less than or equal to i go to step-17 else go to step-25.
Step-17:Initialize j=1
Step-18:If j less than or equal to i go to step-19 else go to step-25
Step-19: Initialize f=1
Step-20: If f less than or equal to i go to step-21 else go to step-23
Step-21:If square of i is equal to sum of squares of c,m,p,j and f go to step-18else go to step-23.

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue VII, July 2017- Available at www.ijraset.com

Step-22: Assign i to a , m to b , y to p , d to j and e to f.
Step-23: If b greater than c go to step-20 else go to step-25.
Step-24: Assign c to b and s to c
Step-25: If c greater than y go to step-20 else goto step-25
Step-26: Assign c to y and s to c
Step-27: If b greater than c go to step-20 else go to step-25.
Step-28: Assign c to b and s to c
Step-29: If c greater than d go to step-20 else goto step-25
Step-30: Assign c to d and s to c
Step-31: If b greater than c go to step-20 else go to step-25.
Step-32: Assign c to b and s to c
Step-33: If c greater than e go to step-20 else goto step-25
Step-34: Assign c to e and s to c
Step-33: Display the integer values b ,c, e, d, y and a.
Step-34: Assign b to c and increment k.
Step-35: Display that the total no. of Pythagoras hexagon as integer value k.
Step-36: Display that if you're interested press 1 else 0.
Step-37: Read the integer l from keyboard.
Step-38: If i is equal to 1 go to step-3 else step-23.
Step-39: STOP.

B. Result Analysis

We required to display all the possible combinations of a Pythagoras hexagon's by taking one side as parameter which is not a hypotenuse. This can be achieved by the following steps.

Step-1: write all the possible combinations that are possible to form a Pythagoras Hexagon by keeping a maximum limit to the hypotenuse.

Step-2: Arrange the side lengths in the combinations in ascending order and count the no. of combinations and display all the combinations and count.

To illustrate how this work let us perform this process with one side length 16 and the maximum limit as 20.

a	**b**	**c**	**e**	**d**	**f**
2	2	3	4	16	17
3	3	5	5	16	18
1	3	3	7	16	18
2	4	6	7	16	19
3	4	4	8	16	19
1	2	6	8	16	19
2	2	4	9	16	19
6	6	6	6	16	19
2	2	6	10	16	19

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue VII, July 2017- Available at www.ijraset.com

Step 1: write all the possible combinations to form Pythagoras Hexagon with the given number 16 are TABLE I
In the above table every combination is a Pythagoras hexagon and satisfies the extension of Pythagoras theorem and we can form total 9 Pythagoras hexagons if one side length is 16 and maximum limit n as 20.
If the side length is exceed the maximum limit n then result displays no Pythagoras Hexagons. For example suppose we take the length of one side as 40 and the maximum limit n as 20 then the result is no Hexagons

III.OUTPUTS

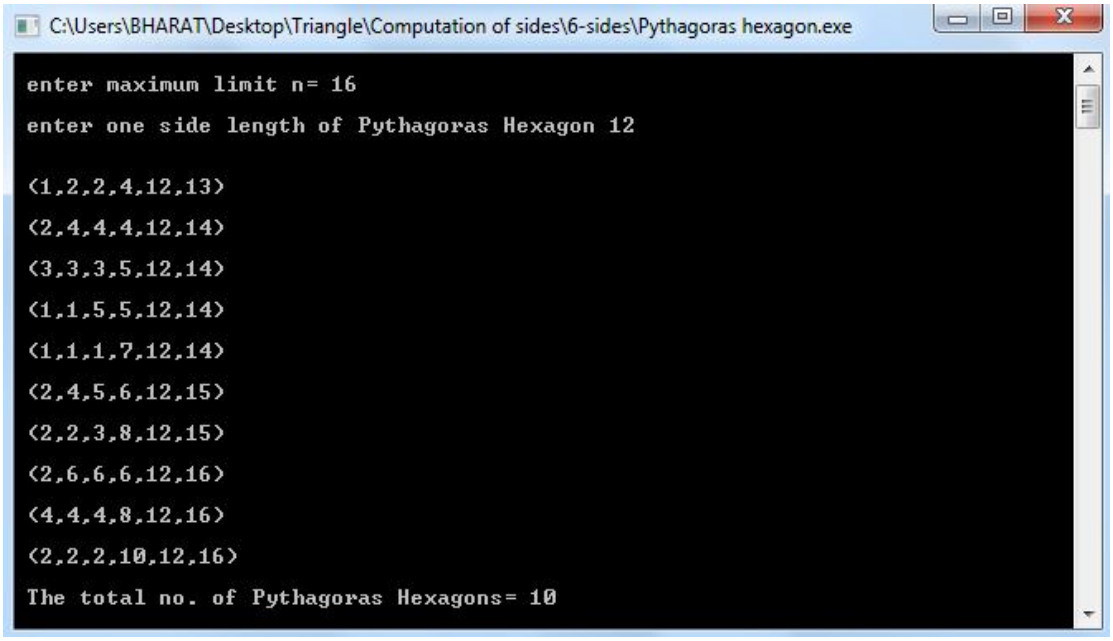


Fig. 1 One side length=12, Maximum limit=16

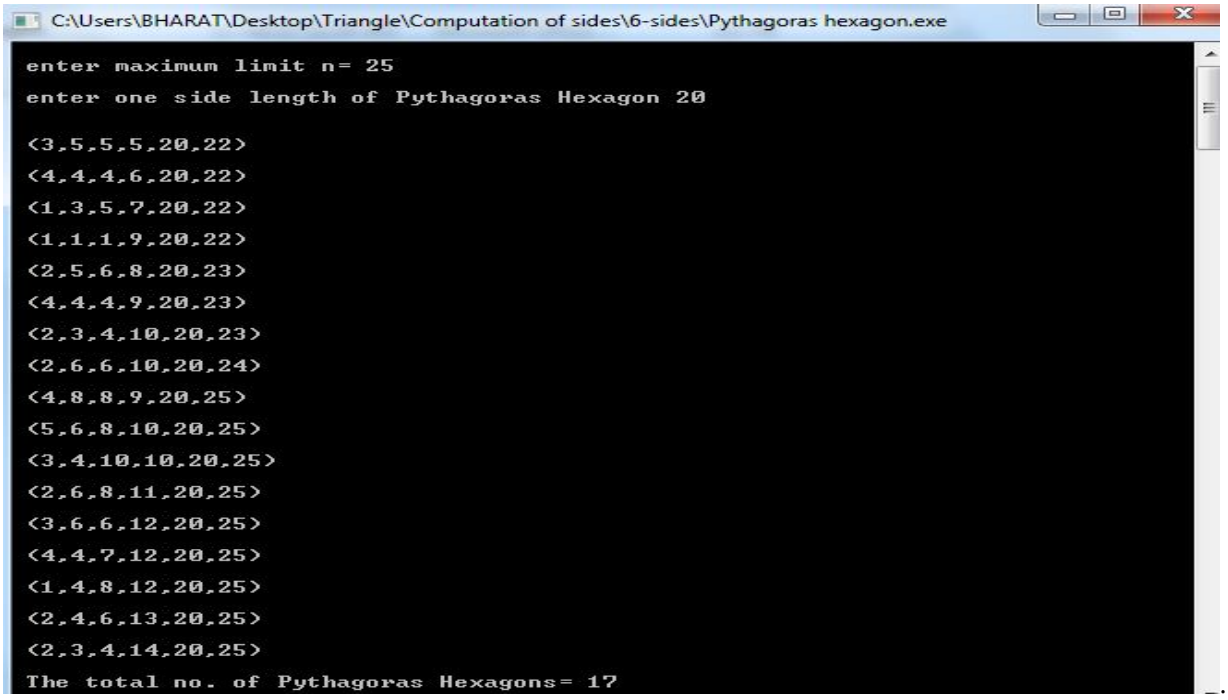


Fig. 2 One side length=20, Maximum limit=25

©IJRASET (UGC Approved Journal): All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 5 Issue VII, July 2017- Available at www.ijraset.com

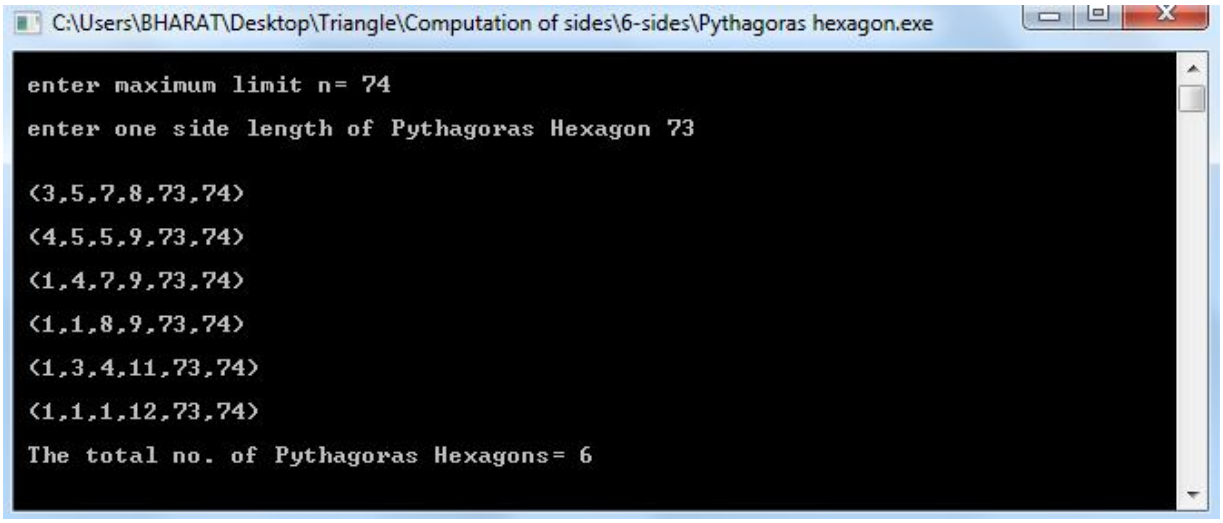


Fig. 2 One side length=73, Maximum limit=74

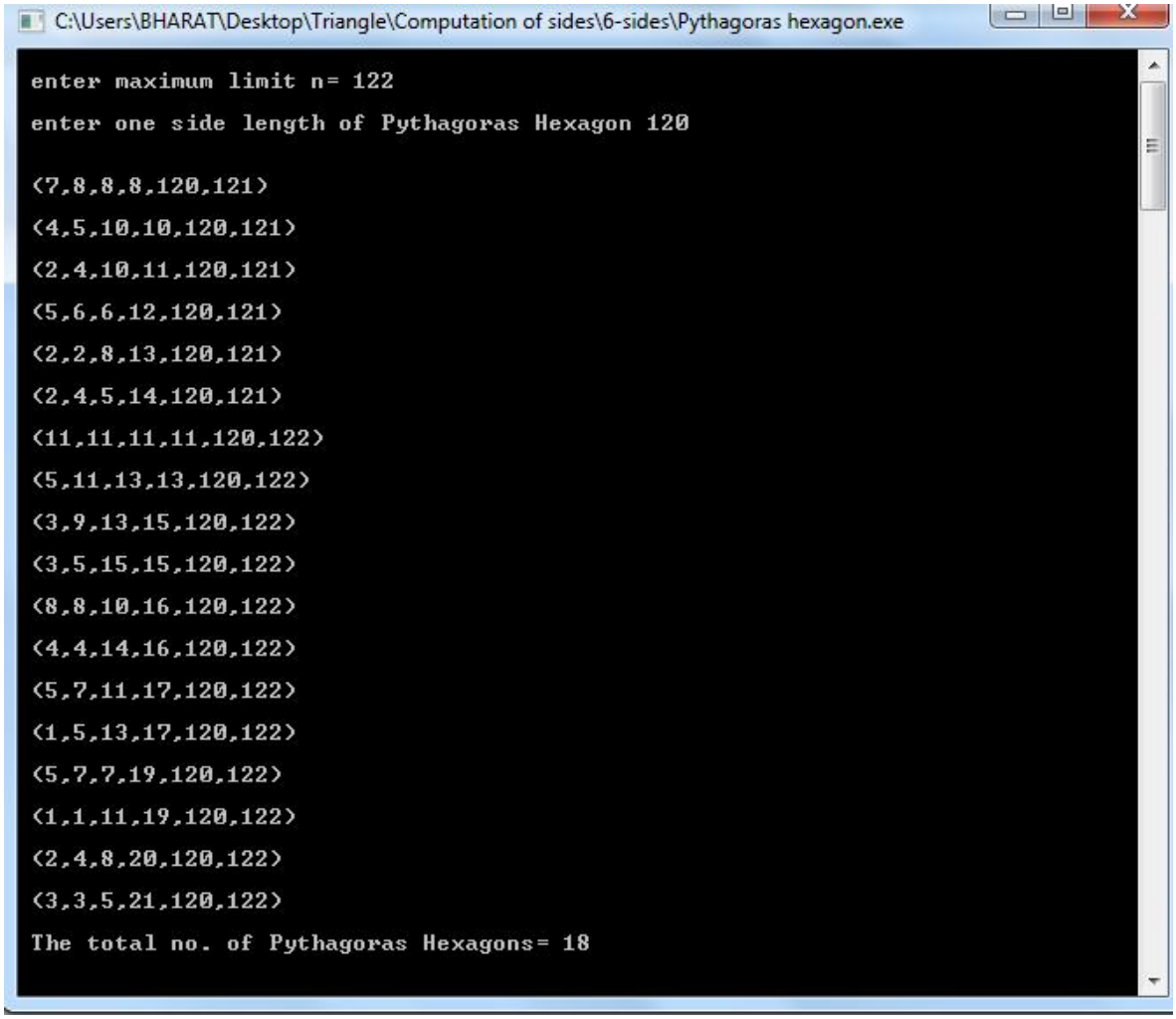


Fig. 4 One side length=120, Maximum limit=122

©IJRASET (UGC Approved Journal): All Rights are Reserved

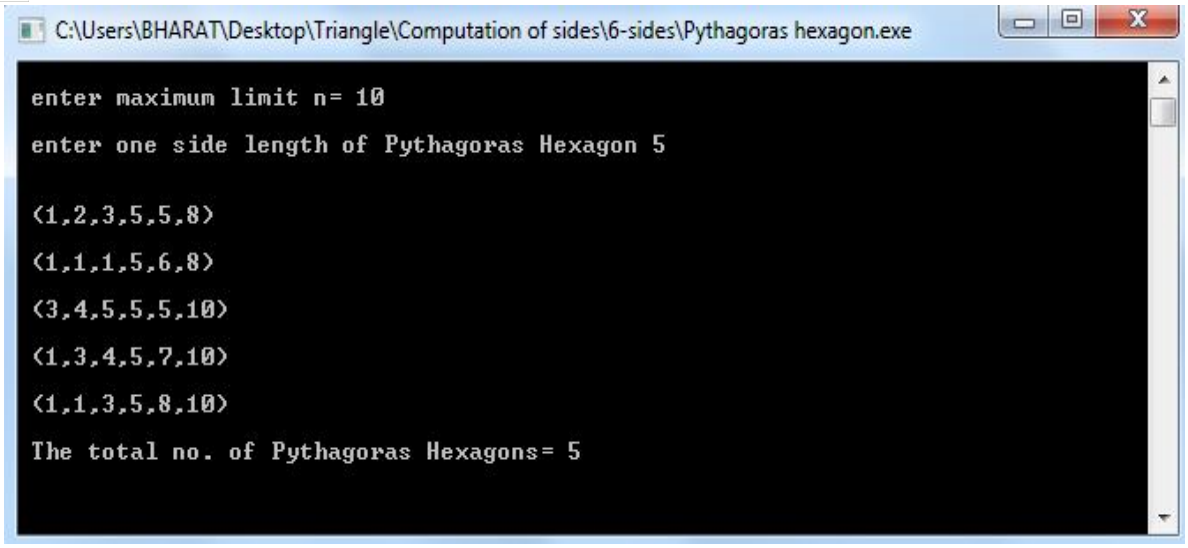


Fig. 5 One side length=5, Maximum limit=10

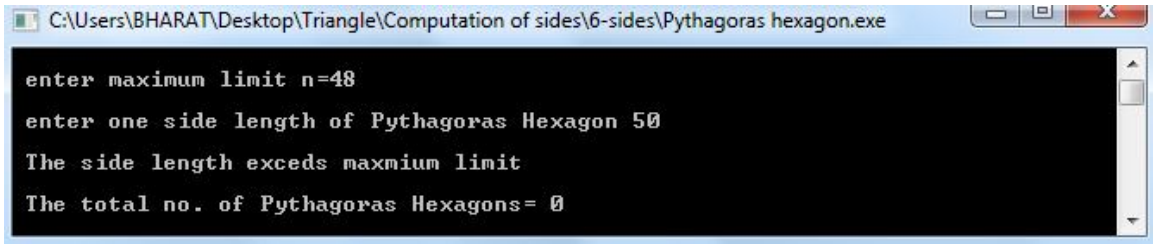


Fig. 6 One side length=50, Maximum limit=48

IV. CONCLUSIONS

The process of finding side lengths using manually is very difficult. So by using C-language finding the Pythagoras hexagon by knowing any one of the side length is becomes novel and easy process. Further we are planning to extend this to Pythagoras n-sided polygon.

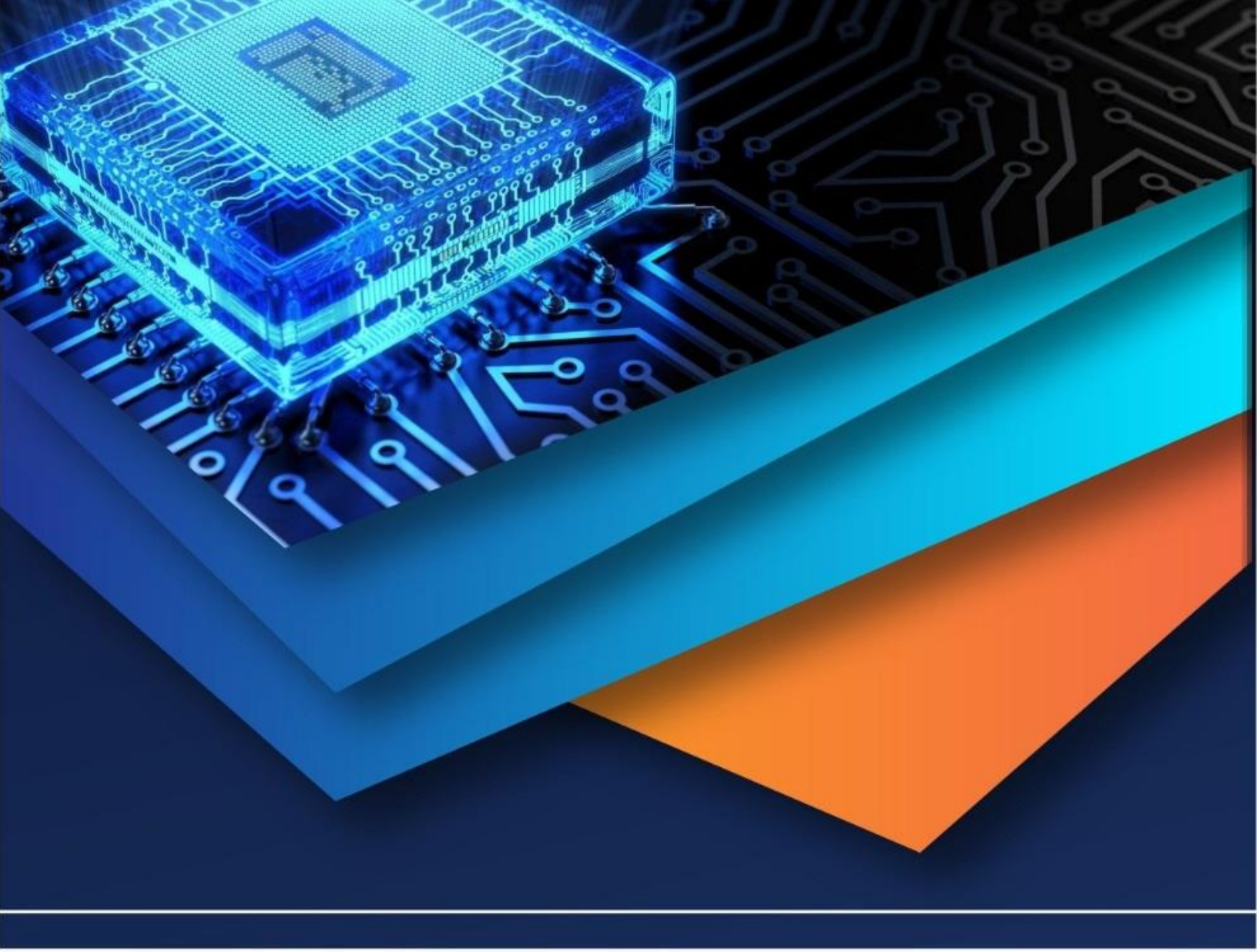
REFERENCES

[1] S.N.R.G.Bharat Iragavarapu, B.saranya, ''Extension of Pythagoras Theorem using Programming Language'', Journal of Information Technology and Sciences, Volume 3 Issue 1, Pg 1-4 , MAT Journals 2017.

[2] S.N.R.G.Bharat Iragavarapu, Computational approach for finding Pythagoras quadrilateral (a, b, c, d), when a or b or c is given and hypotenuse d ≤ n, where n is a natural number'', International Journal of Advanced Research in management Engineering and Technology, ISSN: 2456 – 2998 (Online), Volume 2, Issue 3, March 2017.

[3] S.N.R.G.Bharat Iragavarapu, Computational approach for finding Pythagoras pentagon (a, b, c, d, e), when a or b or c or d is given and hypotenuse e ≤ n, where n is a natural number'', International Journal of Scientific Research and development, ISSN: 2321 – 0613 (Online), Volume 5, Issue 5, june, 2017.

©IJRASET (UGC Approved Journal): All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)