3.5.1 Number of linkages for faculty exchange, student exchange, internship, field trip, on-the-job training, research, etc during the last five years

Activities

Department of Electronics Vivekanand College, Kolhapur

THE NEW COLLEGE, KOLHAUR

DEPARTMENT OF ELECTRONICS

LINKAGE ACTIVITY

1ST OCT. 2019

- A One – day workshop was organized on "FUZZY LOGIC AND ARTIFICIAL INTELLIGENCE" on 1st October 2019 in the department. This workshop was jointly organized by the department of Electronics, The New College, Kolhapur and the department of Electronics, Vivekanand College, Kolhapur as part of linkage activity.
- The workshop was inaugurated by Chief Guest and Resource Person Prof.Dr. R. R. Mudholkar, Ex Coordinator Computer Science Department of Shivaji University, Kolhapur in the presence of Principal Dr. V. M. Patil and Head of the department Dr. A. M. Shaikh and all the teaching and non-teaching staff.
- Dr. A. M. Shaikh welcomed the chief guest, teachers and the students and expressed the objective behind conducting the workshop. Principal Dr. V.M. Patil felicitated chief guest. And shri. A. S. Athanikar proposed vote of thanks. Smt. Deepika Agrawal anchored the inaugural session.
- The students from the Vivekanand College, Kolhapur and Rajaram College, Kolhapur were invited for this workshop. Fifty-three students participated the workshop.

Objective of the workshop

The main objective of this workshop was to create awareness about the upcoming technologies in the field of Electronics.

The workshop was conducted in two sessions.

The morning session was conducted from 11.00 am to 2.00 pm. Prof.Dr. R. R. Mudholkarshared his views on concept of Fuzzy Logic along with Artificial Intelligence.

The afternoon session which was demonstration session conducted from 2.30 pm to 5.30 pm. Shri. D. M. Panhalkar, faculty from Vivekanand College, Kolhapur and Dr. K. D. Attar faculty from The New College, Kolhapur demonstrated some applications of Fuzzy Logic and AI.

The students actively participated in the workshop and they were given hands on experience. All the students were benefitted from this workshop as this concept was new to them.

Outcome of the workshop

Two students of B.Sc. Part – III (i) Satyam Shindeand (ii) Rohan Dhabolehaveselected projects as the fulfilment of the syllabus applying the skills they acquired in this workshop.

Registration of the Workshop

Inauguration, Introduction& Welcome

Lecture and Demonstration

PARTITIONS OF INTEGERS, PARTITION MATRIX AND ITS DETERMINANT

S. P. Patankar[1], S. P. Thorat[2], K. P. Gidde[3] and M. A. Jadhav[4]

[1]Department of Mathematics, Vivekanand College, Kolhapur.

[2]Department of Mathematics, Vivekanand College, Kolhapur.

[3]Department of Mathematics, The New College, Kolhapur.

[4]Department of Computer Science, The New College, Kolhapur.

Author E- mails: [1]patankarsanjayp@gmail.com, [2]thoratsanjay15@gmail.com, [3]kapilgiddekg@gmail.com, [4]ma.ja1984@gmail.com

ABSTRACT

A partition of a positive integer or integer partition is a way of writing n as a sum of positive integers. A number may be represented in different permutation of its summands or parts with same order. We can observe these partition graphically with different diagrams like Young diagram (polyomino) containing Young tableaux, Ferrers diagram. Normal magic square of order n is also partition of $\frac{n(n^2+1)}{2}$, $n \geq 3$. In this paper we are going to discuss concept, order of partition, partition matrix, square partition matrix and relation between determinant of square partition matrix.

KEYWORDS: Permutation, Young Diagram, polyomino, Young tableaux, Ferrers diagram, Magic matrix.

INTRODUCTION

In number theory and combinatorics, a partition of a positive integer n, also called an integer partition, is a way of writing n as a sum of positive integers. Two sums that differ only in the order of their summands are considered the same partition. (If order matters, the sum becomes a composition.) Integer partitions may be encoded as either ascending or descending compositions for the purposes of systematic generation. Many algorithms exist to generate all ascending compositions, to generate all ascending compositions. The ascending composition generation algorithm is substantially more efficient than its descending composition counterpart.

Department of Maths, Lal Bahadur Shashtri College, Satara

8. Recursive/Non Recursive Algorithms to Generate Triangular - Rectangular Numbers Directly / Indirectly Using Pell's Equation through Python 3

Mr. Jadhav Mehul Arun

Assistant Professor, Department of Computer Science (Entire), The New College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Mr. Patankar Sanjay Pandurang

Associate Professor, Head Department of Mathematics, Vivekanand College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Mr. Thorat Sanjay Pandurang

Associate Professor, Head Department of Mathematics, Lal Bahadur Shashtri College of Arts, Science and Commerce, Satara, Maharashtra, Shivaji University, Kolhapur.

Mr. Kulkarni Harshawardhan Raghunath

Research Student, Department of Computer Science (Entire), The New College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Abstract

The aim of this research paper is to study the properties of Triangular-Rectangular numbers with the help of recurrence relations and its solution which will lead to minimize the time complexity and space complexity for such algorithms using Pell's equation.

Keywords: TR Number, Triangular number, Rectangular number, Pell's Equation, Pell-Fermat Equation, Python 3, Recurrence Relation, Chi-Squared Test.

1. Introduction

Definition 1:(Triangular Numbers) Non negative integers represented by $t_n = \frac{n(n+1)}{2}$ are called as triangular numbers. e.g. 0, 1, 3, 6, ...

Definition 2:(Rectangular Numbers) Non negative integers represented by $t_n = n(n+1)$ are called as rectangular numbers i.e. product of two consecutive Natural numbers. e.g. 0, 2, 6, 12, ...

Definition 3:(Triangular-Rectangular Numbers/TR numbers) Non negative integers which are simultaneously triangular as well rectangular are called Triangular-Rectangular Numbers. e.g. 0, 6, 210, 7140, ...

Deparrtment of Botany, Shivaji University, Kolhapur

SHRI PRINCE SHIVAJI MARATHA BOARDING HOUSE, KOLHAPUR

THE NEW COLLEGE, KOLHAPUR

DEPARTMENT OF BOTANY

Activity Organized under Linkage with Department of Botany, Shivaji University, Kolhapur

Organized a Guest lecture

On

Tissue Culture Techniques

18th August 2018

Time 2.00pm to 2.10pm	Welcome and Introduction Dr. M.B. Waghmare, HOD Botany
Time 2.10pm to 2.15pm	Introduction of Chief guest Dr. N.V. Pawar
Time 2.15pm to 2.20pm	Address by Principal, Dr. N.V. Nalawade
Time 2.20pm to 3.20pm	**Chief Guest address** **Dr. Swarupa Patil,** **Shivaji University,** **Kolhapur.**
Time 3.20pm to 3.30pm	Vote of Thanks Mr. S. A. Deshmukh

Head
The Department of Botany
The New College.
KOLHAPUR

PRINCIPAL
THE NEW COLLEGE, KOLHAPUR

Department of Botany - Shri Shahaji Chtrapati College

Inauguration of
'Green Corner'
&
'Introduction of Our Botanist'
Organized by Department of Botany

Thursday, 25th July 2019 - 12.30 p.m.

❖ Program Schedule ❖

➤ **Introduction** : **Dr. M. M. Aitawade**
Science Co-ordinator & Head, Dept. of Botany

➤ **Chief Guest** : **Dr. M. B. Waghmare**
Head, Dept. of Botany,
The New College, Kolhapur
BOS Member, Shivaji University, Kolhapur

➤ **President** : **Dr. R. K. Shanediwan**
Principal,
Shri Shahaji Chh. Mahavidyalaya

➤ **Presence** : **Dr. N. S. Jadhav**
Co-ordinator, IQAC
Shri Shahaji Chh. Mahavidyalaya
Mr. R. J. Bhosale
Registrar
Mr. M. V. Bhosale
Office Superintendent

• **Vote of Thanks** : **Dr. P. P. Jadhav**
Dept. of Botany

❖ Place ❖

Green Corner,
Shri Shahaji Chhatrapati Mahavidyalaya, Kolhapur

SHRI PRINCE SHIVAJI MARATHA BOARDING HOUSE , KOLHAPUR

THE NEW COLLEGE, KOLHAPUR

DEPARTMENT OF BOTANY

Activity Organized under Linkage with Chatrapati Shahaji College, Kolhapur

A Guest lecture

On

Family Begoniaceae

30th November 2018

Time 2.00pm to 2.10pm	Welcome and Introduction Dr. M.B. Waghmare, HOD Botany
Time 2.10pm to 2.15pm	Introduction of Chief guest Mr. S. A. Deshmukh
Time 2.15pm to 2.20pm	Address by Principal, Dr. N.V. Nalawade
Time 2.20pm to 3.20pm	**Chief guest address Dr. M. M. Aitwade Chhatrapati Shahaji College, Kolhapur**
Time 3.20pm to 3.30pm	Vote of Thanks Dr. V. B. Shimpale

Head
he Department of Botany
The New College.
KOLHAPUR

PRINCIPAL,
THE NEW COLLEGE, KOLHAPUR

Department of Computer science and Computer applications,
Dattajirao Kadam Arts, Science and Commerce College, Ichlkaranji.

27. Divisibility, Compressed Representation, Sum of Digits in any Base and its Implementation in Improved Python 3

Mr. Jadhav Mehul Arun
Assistant Professor, Department of Computer Sciences Entire, The New College, Kolhapur.
Maharashtra, Shivaji University, Kolhapur.
Ms. Patil Rajashri Yashawant
Assistant Professor, Department of Computer Science, Vivekanand College, Kolhapur.
Maharashtra, Shivaji University, Kolhapur.
Mr. Swami Akshay Ramesh
Assistant Professor, Head Department of Computer Science, Dattajirao Kadam Arts, Science
And Commerce College, Ichalkaranji, Maharashtra, Shivaji University, Kolhapur.
Chougale Shubham Pandurang
Research Student, Department of Computer Science, Vivekanand College, Kolhapur.
Maharashtra, Shivaji University, Kolhapur.

Abstract

The aim of this research paper is to study the divisibility, reduced representation in any base number system for integers, try to generalise divisibility rules for $\beta, \beta^n, \beta + 1, \beta - 1$, their factors, sum of digits in single digit form and to find implementation in Python3.

Keywords: Division Algorithm, Divides, int, class, constructor, digits

1. Introduction

Number system of Integers in base (β):

Let $\beta \cdot 1$ is in as an integer with $D_\beta = \{0,1,2,\ldots,\beta-1\}$ is digit set. If x is an integer number is base β then it is represented as $(x)_\beta = a_0\beta^n + a_1\beta^{n-1} + \cdots + a_{n-1}\beta + a_n$ where $a_0 \neq 0 \& a_1, a_2, \ldots, a_n \in D_\beta, n \in N$
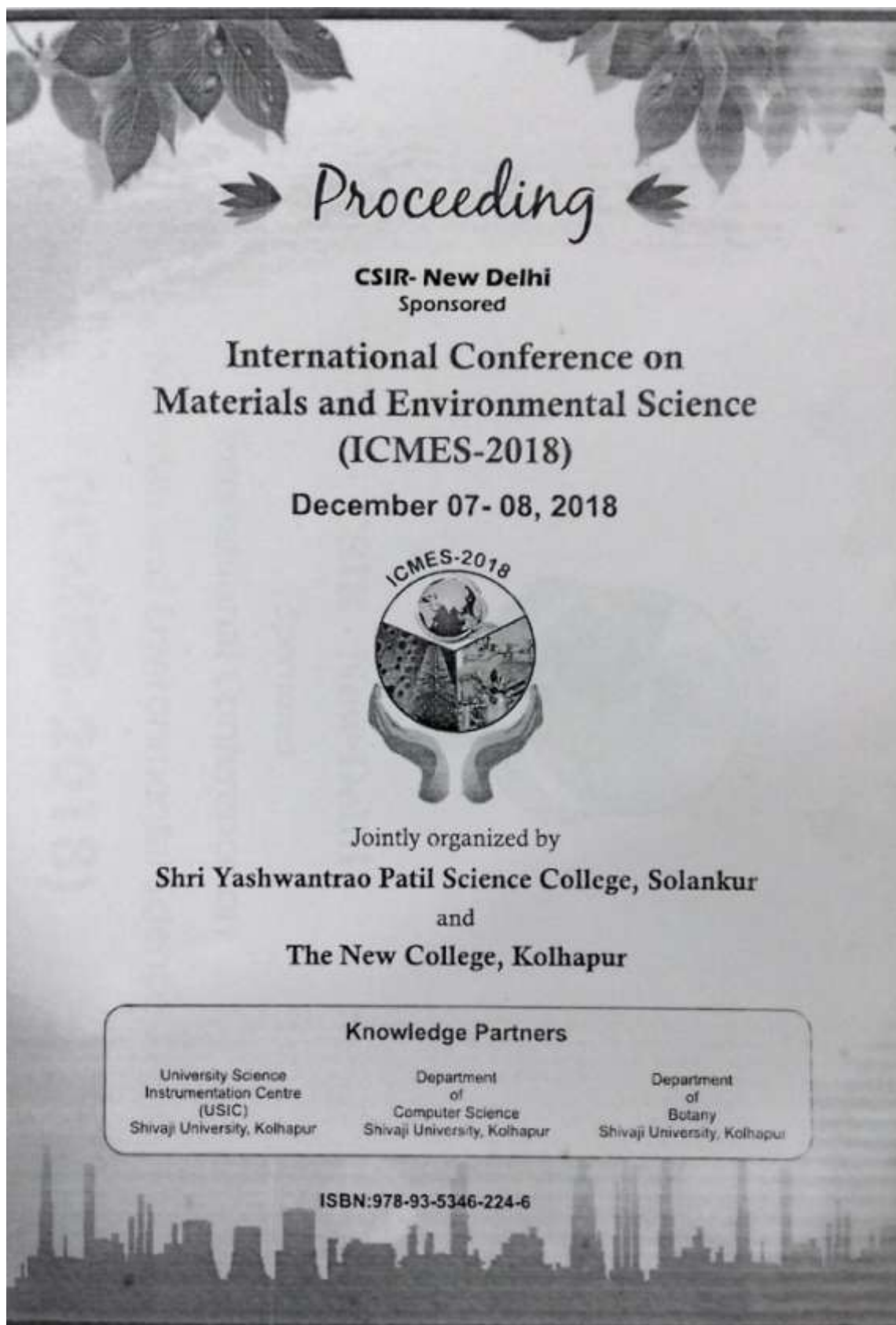
Division Algorithms: For $a, b, q, r \in Z^0, b = aq + r, a < b, q \in Z \& 0 \leq r < |a|$

Divides: If $r = 0$ then $a|b$

Divides in base β ($\beta > 1$): If $(a)_\beta |(b)_\beta$ then we say that $a|_\beta b$ and $a|_\beta b \Rightarrow a|_{10}b$

If $a|b$ then $a|_\beta b$ where $\beta \in Z^+, \beta \geq 2$

Solankur Department of Chemistry - Vijaysinha Yadav College, Peth – Vadgaon

➤ *Proceeding* ◀

CSIR- New Delhi
Sponsored

International Conference on Materials and Environmental Science (ICMES-2018)

December 07- 08, 2018

Jointly organized by

Shri Yashwantrao Patil Science College, Solankur

and

The New College, Kolhapur

Knowledge Partners

| University Science Instrumentation Centre (USIC) Shivaji University, Kolhapur | Department of Computer Science Shivaji University, Kolhapur | Department of Botany Shivaji University, Kolhapur |

ISBN:978-93-5346-224-6

Department of Botany - Shri Yashwantrao Patil Science College, Peth – Vadgaon

SHRI PRINCE SHIVAJI MARATHA BOARDING HOUSE, KOLHAPUR

THE NEW COLLEGE, KOLHAPUR

DEPARTMENT OF BOTANY

Activity Organized under Linkage with

Vijaysinh Yadav College, Pethvadgaon

Activity Name: Guest lecture

On

Family Asteraceae of Maharashtra

12th August 2018

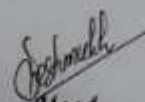|	
Time 2.00pm to 2.10pm	Welcome and Introduction Dr. M.B. Waghmare, HOD Botany
Time 2.10pm to 2.15pm	Introduction of Chief guest Dr. V.B Shimple
Time 2.15pm to 2.20pm	Address by Principal, Dr. N.V. Nalawade
Time 2.20pm to 3.20pm	**Chief Guest address Mr. D.G. Jagtap, Vijaysinha Yadav College, Peth vadagaon.**
Time 3.20pm to 3.30pm	Vote of Thanks Dr. N.V. Pawar

Head
the Department of Botany
The New College.
KOLHAPUR

THE NEW COLLEGE, KOLHAPUR

Department of Political Science, Gopalkrishna Gokhale College, Kolhapur

Activities under Linkagebetween
Department of Political Science, THE NEW COLLEGE
KOLHAPUR   &
Gopal Krishna Gokhale College, Kolhapur

Sr.No.	Name of activity	Date	No. of Student present	
1.	Lecture delivered on Election Campaign by Mr. Rajratan Jadhav NCK	14/02/2018	25	
2	Lecture delivered on Our Constitution by Mr. Sidharth Rakshase	09/01/2020	20	

Coordinator

(R.S.Jadhav)

HEAD,
Department of Political Science,
The New College, Kolhapur.

Department of Statistics Rajarshi Chhatrapati Shahu College, Kolhapur

Outward No: /2017-2018

Date: 18/04/2018

To

Dr. A. A. Kalgonda,
Head, Department of Statistics,
The New College,
Kolhapur

Subject: Invitation for delivering Guest Lecture on **"Designs of Experiments".**

Sir,
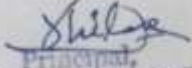
Department of Statistics of our college is organized fifteen days' workshop on Training Program for M.Sc. entrance examination in Statistics. We cordially invites you as a guest lecture to deliver lecture on **"Designs of Experiments – Factorial experiment, Total and Partial Confounding"** on Sunday, 29/04/2018 at 10.30 a.m. to 12.30 p. m. for B. Sc. III students. We would be glad if you accept our invitation. Thanking in anticipation.

With warm regards.

Venue: Rajarshi Chhatrapati Shahu College, Kadamwadi Road, Kolhapur

Day and Date: Sunday, 29/04/2018

Time: 10.30 to 12.30 p. m.

Thanking you,

Yours Faithfully,

Principal,
Rajarshi Chh. Shahu College
Kolhapur.

Estd : 1961
Rayat Shikshan Sanstha's

RAJARSHI CHHATRAPATI SHAHU COLLEGE

Kadamwadi Road, Kolhapur - 416 003. (Maharashtra)

(Arts, Commerce, Science, B. C. A., B. C. S. and Vocational)

NAAC Reaccredited 'A'(with CGPA-3.07)

Dr.Khilare C.J.
M.Sc.,M.Phil.,Ph.D.
Principal

Office Phone No. : 0231- 2654658, 2656027,
Fax : 0231-2654658 E-mail : klpshahucol@gmail.com
Website : www.erayat.org/SMK

Univ. Aff. No. UKF-
1092/4970/M-SHI-3/1994
Jr. College Code J 23.09.00

Outward No: /2017-18

Date: 02/05/2018

Dr. A. A. Kalgonda,
Head, Department of Statistics,
The New College,
Kolhapur
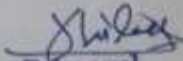
Subject: Letter of Thanks.

Respected Sir,

We are very much thankful to you sir for sparing your valuable time with us and delivering a nice lecture on **"Designs of Experiments – Factorial experiment, Total and Partial Confounding"** on Sunday, 29/04/2018 for B. Sc. III students in the workshop on **"Training Programme for M. Sc. Entrance Examination in Statistics"**. Sir, we assure you that your valuable guidance to students will definitely help them to focus to appear the examination and making their career.

Thanking you,

Yours Faithfully,

Principal,
Rajarshi Chh. Shahu College
Kolhapur.

" Education through self-help is our motto"- Karmveer
Rayat Shikshan Sanstha's

RAJARSHI CHHATRAPATI SHAHU COLLEGE, KOLHAPUR

NAAC REACCREDITED 'A'(WITH CGPA 3.07)

DEPARTMENT OF STATISTICS

Certificate

This is to certify that Prof./Shri/Smt *Dr.A. A. Kalgonda* of
The New College, Kolhapur has attended and Participated/delivered a lecture as

Resource Person/Successfully completed workshop on "Training Programme for M.Sc.Entrance Examination in Statistics" organized

by Department of Statistics Rajarshi Chhatrapati Shahu College, Kolhapur on 20/4/2018 to 05/05/2018

Prof. P. S. Chougule
Co-ordinator and Head,
Department of Statistics

Mr. G. S. Bansode
Incharge,
Short Term Courses

Dr. C. J. Khilare
Principal,
R. C. Shahu College, Kolhapur

Estd : 1961

Rayat Shikshan Sanstha's

RAJARSHI CHHATRAPATI SHAHU COLLEGE

Kadamwadi Road, Kolhapur - 416 003. (Maharashtra)

(Arts, Commerce, Science, B. C. A., B. C. S. and Vocational)

NAAC Reaccredited 'B' (with CGPA 2.84)

Dr. R. R. Kumbhar

M.Sc., M.Phil., Ph.D., M.A.

Incharge Principal

Ref. No. 15|15-16   Date. : 12/4/2016

To

Dr.A.A. Kalgonda

The New College,

Kolhapur

Sub: Invitation as resource person for Crash course in career advancement.

Dear Sir,

Our College is going to organize ten days Crash course in 'Career Advancement for B.Sc. III Appeared Students'. We are pleased to invite you as a resource person for this course to deliver a lecture on topic "Design of Experiment". Your lecture is scheduled on 13th ,14th April 2016. at 9:15 a.m. in Seminar hall of the college.

Herewith request you to accept our invitation and positive response from your side.

With regards,

Yours faithfully,

Principal,

Rajarshi Chh. Shahu College

Kolhapur

Estd : 1961
Rayat Shikshan Sanstha's

RAJARSHI CHHATRAPATI SHAHU COLLEGE

Kadamwadi Road, Kolhapur - 416 003. (Maharashtra)

(Arts, Commerce, Science, B. C. A., B. C. S. and Vocational)

NAAC Reaccredited 'B' (with CGPA 2.84)

Dr. R. R. Kumbhar

M.Sc., M.Phil., Ph.D., M.A.

Incharge Principal

Ref. No. _____   Date. : 14/4/2016

To,

Dr.A.A. Kalgonda
The New College,
Kolhapur

Sub.: Letter of Thanks.

Respected Sir,

We the faculty members of this college & participants of the crash course are greatly honored & overwhelmed by your esteemed presence amongst us as a resource person at ten day crash course in Career Advancement of B.Sc.III held during 5 th and 15th April. 2016.

We are very much thankful to you sir for accepting our invitation, sparing your valuable time with us and delivering a nice lecture on 'Design of Experiments ' held during 13th ,14th April 2016. We expect similar kind of cooperation in future. Once again we thank you very much for your kind cooperation. With warmest regards,

Yours faithfully,

Principal,
Rajarshi Chh. Shahu College
Kolhapur.

Department of Botany – Bhogawati College

SHRI PRINCE SHIVAJI MARATHA BOARDING HOUSE, KOLHAPUR

THE NEW COLLEGE, KOLHAPUR

DEPARTMENT OF BOTANY

Activity Organized under Linkage with Bhogawati Mahavidyalaya, Kurukali

Organized a Guest lecture.

On

Dyes and Perfume Yielding Plants

21th October 2018

Time 2.00pm to 2.10pm	Welcome and Introduction Dr. M.B. Waghmare, HOD Botany
Time 2.10pm to 2.15pm	Introduction of Chief guest Mr. S. A. Deshmukh
Time 2.15pm to 2.20pm	Address by Principal, Dr. N.V. Nalawade
Time 2.20pm to 3.20pm	Chief Guest address Mr. R.S. Bhosale , Bhogawati Mahavidyalaya, Kurukali.
Time 3.20pm to 3.30pm	Vote of Thanks Dr. V.B Shimpale

Head
the Department of Botany
The New College.
KOLHAPUR

PRINCIPAL
THE NEW COLLEGE, KOLHAPUR

Department of Computer science Vivekanand College, Kolhapur

27. Divisibility, Compressed Representation, Sum of Digits in any Base and its Implementation in Improved Python 3

Mr. Jadhav Mehul Arun
Assistant Professor, Department of Computer Sciences Entire, The New College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Ms. Patil Rajashri Yashawant
Assistant Professor, Department of Computer Science, Vivekanand College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Mr. Swami Akshay Ramesh
Assistant Professor, Head Department of Computer Science, Dattajirao Kadam Arts Science And Commerce College, Ichalkaranji, Maharashtra, Shivaji University, Kolhapur.

Chougale Shubham Pandurang
Research Student, Department of Computer Science, Vivekanand College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Abstract

The aim of this research paper is to study the divisibility, reduced representation in any base number system for integers, try to generalise divisibility rules for $\beta, \beta^n, \beta + 1, \beta - 1$, their factors, sum of digits in single digit form and to find implementation in Python3.

Keywords: Division Algorithm, Divides, int, class constructor, digits

1. Introduction

Number system of Integers in base (β):

Let $\beta - 1$ is in as an integer with $D_\beta = \{0, 1, 2, \dots, \beta - 1\}$ is then set. If x is an integer number is base β then it is represented as. $(x)_\beta = a_0 \beta^n + a_1 \beta^{n-1} + \dots + a_{n-1} \beta + a_n$ where $a_0 \neq 0 \& a_1, a_2, \dots, a_n \in D_\beta, n \in N$

Division Algorithms: For $a, b, q, r \in Z^0, b = aq + r, a < b, q \in Z \& 0 \leq r < |a|$

Divides: If $r = 0$ then $a | b$

Divides in base β ($\beta > 1$): If $(a)_\beta | (b)_\beta$ then we say that $a|_\beta b$ and $a|_\beta b \Rightarrow a|_{10} b$

If $a | b$ then $a|_\beta b$ where $\beta \in Z^+, \beta \geq 2$

Modular Arithmetic and C Data Types: Unsigned Integrals

Sanjay P. Patankar

Associate Professor,
Vivekanand College,
Tarabai Park, Kolhapur
E-mail: patankarsanjay@gmail.com

Sanjay P. Thorat

Associate Professor,
Vivekanand College,
Tarabai Park, Kolhapur
E-mail: thoratsanjay15.a@gmail.com

Amit A. Athanikar

Associate Professor,
The New College,
Shivaji Peth, Kolhapur
E-mail: amitathanikar@gmail.com

Mehul A. Jadhav

Associate Professor,
The New College,
Shivaji Peth, Kolhapur
E-mail: maja1984@gmail.com

ABSTRACT

In mathematics "Modular arithmetic" is a system of arithmetic for integers. It can be handled by introducing a congruence relation (which is equivalence relation i.e. reflexive, symmetric and transitive) compatible with arithmetic operators like addition, subtraction and multiplication. Famous finite sets defined in algebra with modular arithmetic are integer modulo n i.e. which are cyclic group with respect to operators addition modulo n " " and multiplication modulo n " ". C language has 3 unsigned integral data types namely unsigned char (8 bits), unsigned int (16 bits) and unsigned long int (32 bits). In this paper, we check whether these 3 data types follows modular arithmetic with respect to addition and multiplication operators in C and relation between these three data types.

***Keywords:** Congruence relation, equivalence relation, reflexive, symmetric, transitive, Group.*

In mathematics, modular arithmetic is a system of arithmetic for integers, where numbers "wrap around" upon reaching a certain value - the modulus. If we have 8 bit integer and we have store 255 in it, then bit pattern is [11111111] if we apply 8 bit shift operator on it, some of the data may be lost after some iteration, modular arithmetic works on same principle. In C programming language there are three types of data types: Abstract Data types (Arrays, Functions, Pointers), User-defined Data types (structure, union, enumerated data type), Built in Data types (void, integral, floating). Integral Data types are categorized using qualifiers signed and unsigned. We just discuss here unsigned integrals: unsigned char ranges from to, unsigned short ranges from to and unsigned long ranges from to 429496.

ONENESS OF NATURAL NUMBER: TERNARY PARTITIONS OF ODD NATURAL NUMBERS

Mr. S. P. Patankar
Associate Professor
Vivekanand College, Kolhapur

Mr. S. P. Thorat
Associate Professor
Vivekanand College, Kolhapur

Mr. M. A. Jadhav
Assistant Professor
The New College, Kolhapur

Miss R. P. Choudhary
Student B. Sc. II
Vivekanand College Kolhapur

Abstract:

The aim of this paper is to study the properties of Ternary partitions odd natural numbers which are one step previous to 4^n using calculation of oneness factor, hit factor or convergent factor of every natural number with hailstone sequence to reach one.

Keywords $3n + 1$ conjecture, Collatz conjecture, Collatz function, Hailstone sequence, Hasse algorithm, factor, HOTPO, Kakutani's problem, Thwaites conjecture, Ulam conjecture.

Introduction:

The Collatz conjecture is a conjecture in mathematics named after Lothar Collatz, who first proposed it in 1937. This conjecture is also known as the $3n + 1$ conjecture. The problem can be simply stated as, starts with any positive integer, if it is even number, halve it (which has been called "Half Or Triple Plus One", or **HOTPO**). Otherwise multiply it by 3 and add 1 to it. Take the result and repeat the process. Any such sequence seems to end up at one. The conjecture remains unanswered, although it has been proven that the process terminates for all values of n up to 5.764×10^{18}.

Let $f: N \rightarrow N$ be Collatz function defined as: $f(x) = \begin{cases} \frac{x}{2} & \text{if } x \text{ is even} \\ 3x + 1, & \text{if } x \text{ is odd} \end{cases}$

Collatz conjecture states that, if $x \in N$, then the sequence $x, f(x), f \circ f(x), f \circ f \circ f(x), \ldots$ reaches to 1. The number of iterations is not proportional to the magnitude of the starting number. And hence remain unsolved yet.

Oneness Of Natural Number, Oneness Factor/Hit Factor:-

Definition 2.1:- (Oneness of Natural Number) The ability of a natural number reaching to 1 with conjecture function f is called as oneness of natural number.

Definition 2.2:- (Hit Factor) The conjecture asserts that every natural number n has a well-defined Hit Factor. Total number of steps required by a natural number n to reach 1 using $f(x)$ is called as Total stoppage time or oneness factor of n.

Definition 2.3:- (Hit Factor Function) Let $T: N \rightarrow N$ be Hit Factor function defined over set of natural number as the total number steps needed to reach 1.

2.3.1 Hit Factor of Natural Number 2^n.

$T(2^n) = n$, e.g. $T(1) = 0$, $T(2) = 1$, $T(4) = 6$.

2.3.2 Hit Factor of odd Natural Numbers having $n + 1$ hit factor :

Now we are familiar to the term than even number decreases, so we just emphasize on odd numbers. To find out odd number which transform to 2^n.

2.3.1 Result: If k be any natural number then $3|4^k - 1$.

2.3.2 Result: If n be a odd natural number and $r = 2k$ be the power of 2 then $3n + 1 = 2^r$ and $n = \{4^{k-1} + 4^{k-2} + \cdots + 4 + 1\}$.

ONENESS OF NATURAL NUMBER: COLLATZ CONJECTURE

S. P. Patankar,
Head, Department of Mathematics,
Vivekanand College, Kolhapur

S. P. Thorat
Department of Mathematics,
Vivekanand College, Kolhapur

M. A. Jadhav
Department of Computer Science,
The New College, Kolhapur

ABSTRACT

The Collatz conjecture is a conjecture in mathematics named after Lothar Collatz, who first proposed it in 1937. The conjecture is also known as the $3n + 1$ conjecture, the Ulam conjecture after Stanislaw Ulam, Kakutani's problem after Shizuo Kakutani, the Thwaites conjecture after Sir Bryan Thwaites; Hasse's algorithm after Helmut Hasse, or the Syracuse problem; the sequence of numbers involved is referred to as the hailstone sequence or hailstone numbers because the values are usually subject to multiple descents and ascents like hailstones in a cloud, or as wondrous numbers. The eminent mathematician Paul Erdos suggested: "Mathematics is not ready for this kind of problem". Here we try to calculate the oneness factor, hit factor or convergent factor of every natural number with hailstone sequence to reach one by classifying natural numbers.

Keywords. Collatz conjecture, $3n + 1$ conjecture, Hailstone sequence, Thwaites conjecture, hit factor, HOTPO

INTRODUCTION:

One of the most tantalizing conjectures in number theory is the so called $3n + 1$ conjecture, stated by L. Collatz (1937). The problem can be simply stated as, starts with any positive integer. If it is even number, halve it (which has been called "Half Or Triple Plus One", or HOTPO). Otherwise multiply it by 3 and add 1 to it. Take the result and repeat the process.

Any such sequence seems to end up at one. The conjecture remain unanswered, although it has been proven that the process terminates for all values of n up to 5.764×10^{19}

Let $f : z \to z$ be defined as:

$$f(x) = \begin{cases} \dfrac{x}{2}, & \text{if } x \text{ is even} \\ 3x + 1, & \text{if } x \text{ is odd} \end{cases}$$

Collatz conjecture states that if $x \in N$, then the sequence $x, f(x), f \cdot f(x), f \cdot f \cdot f(x), \cdots$, reaches to 1. If $x = 21$ then sequence produced is,

Steps	0	1	2	3	4	5	6	7
Value	21	64	32	16	8	4	2	1

The sequence has no obvious pattern, and no explanation that why the sequence should take 7 iterations to reach 1. When $x = 27$ it takes 111 steps. Hence the number of iterations is not proportional to the magnitude of the starting number. And hence remain unsolved yet.

Oneness of Natural Number :

The ability of a natural number reaching to 1 with collatz conjecture function f is called as oneness of natural number.
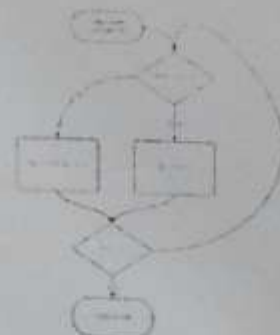
MODULAR ARITHMETIC AND C DATA TYPES: SIGNED INTEGRALS

S. P. Patankar[1], S. P. Thorat[2], R. Y. Patil[3], A. S. Athanikar[4] and M. A. Jadhav[5]

[1]Department of Mathematics, Vivekanand College, Kolhapur.

[2]Department of Mathematics, Vivekanand College, Kolhapur.

[3]Department of Computer Science, Vivekanand College, Kolhapur.

[4]Department of Electronics, The New College, Kolhapur.

[5]Department of Computer Science, The New College, Kolhapur.

Author E- mails: [1]patankarsanjayp@gmail.com, [2]thoratsanjay15@gmail.com,
[3]raj_shendre@yahoo.co.in, [4]amitathanikar@gmail.com, [5]ma.ja1984@gmail.com

ABSTRACT

In mathematics "Modular Arithmetic" is a system of arithmetic for integers. It can be handled by introducing a congruence relation (which is equivalence relation i.e. reflexive, symmetric and transitive) compatible with arithmetic operators like addition, subtraction and multiplication. Famous finite sets defined in algebra with modular arithmetic are integer modulo n i.e. Z_n and Z_n^* which are cyclic group with respect to operators addition modulo n "$+_n$" and multiplication modulo n "$\cdot_n$". C language has 3 signed integral data types namely signed char (8 bits), signed int(16 bits) and signed long int (32 bits). In this paper we check whether these 3 data types follows modular arithmetic with respect to addition and multiplication operator in C and relation between these three data types.

KEYWORDS: Congruence relation; equivalence relation; reflexive; symmetric; transitive; Group.

INTRODUCTION

In mathematics, modular arithmetic is a system of arithmetic for integers, where numbers "wrap around" upon reaching a certain value—the modulus. If we have 8 bit integer and we have store 255 in it, then bit pattern is [11111111] if we apply 8 bit shift operator on it, some of the data may be lost after some

PARTITIONS OF INTEGERS, PARTITION MATRIX AND ITS DETERMINANT

S. P. Patankar[1], S. P. Thorat[2], K. P. Gidde[3] and M. A. Jadhav[4]

[1]*Department of Mathematics, Vivekanand College, Kolhapur.*

[2]*Department of Mathematics, Vivekanand College, Kolhapur.*

[3]*Department of Mathematics, The New College, Kolhapur.*

[4]*Department of Computer Science, The New College, Kolhapur.*

Author E- mails: [1]*patankarsanjayp@gmail.com,* [2]*thoratsanjay15@gmail.com,*
[3]*kapilgiddekg@gmail.com,* [4]*ma.ja1984@gmail.com*

ABSTRACT

A partition of a positive integer or integer partition is a way of writing n as a sum of positive integers. A number may be represented in different permutation of its summands or parts with same order. We can observe these partition graphically with different diagrams like Young diagram (polyomino) containing Young tableaux, Ferrers diagram. Normal magic square of order n is also partition of $\frac{n(n^2+1)}{2}$, $n \geq 3$. In this paper we are going to discuss concept, order of partition, partition matrix, square partition matrix and relation between determinant of square partition matrix.

KEYWORDS: Permutation, Young Diagram, polyomino, Young tableaux, Ferrers diagram, Magic matrix.

INTRODUCTION

In number theory and combinatorics, a partition of a positive integer n, also called an integer partition, is a way of writing n as a sum of positive integers. Two sums that differ only in the order of their summands are considered the same partition. (If order matters, the sum becomes a composition.) Integer partitions may be encoded as either ascending or descending compositions for the purposes of systematic generation. Many algorithms exist to generate all ascending compositions, to generate all ascending compositions. The ascending composition generation algorithm is substantially more efficient than its descending composition counterpart.

8. Recursive/Non Recursive Algorithms to Generate Triangular - Rectangular Numbers Directly / Indirectly Using Pell's Equation through Python 3

Mr. Jadhav Mehul Arun

Assistant Professor, Department of Computer Science (Entire), The New College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Mr. Patankar Sanjay Pandurang

Associate Professor, Head Department of Mathematics, Vivekanand College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Mr. Thorat Sanjay Pandurang

Associate Professor, Head Department of Mathematics, Lal Bahadur Shashtri College of Arts, Science and Commerce, Satara, Maharashtra, Shivaji University, Kolhapur.

Mr. Kulkarni Harshawardhan Raghunath

Research Student, Department of Computer Science (Entire), The New College, Kolhapur, Maharashtra, Shivaji University, Kolhapur.

Abstract

The aim of this research paper is to study the properties of Triangular-Rectangular numbers with the help of recurrence relations and its solution which will lead to minimize the time complexity and space complexity for such algorithms using Pell's equation.

Keywords: TR Number, Triangular number, Rectangular number, Pell's Equation, Pell-Fermat Equation, Python 3, Recurrence Relation, Chi-Squared Test.

1. Introduction

Definition 1:(Triangular Numbers) Non negative integers represented by $t_n = \frac{n(n+1)}{2}$ are called as triangular numbers. e.g. 0,1,3,6, ...

Definition 2:(Rectangular Numbers) Non negative integers represented by $t_n = n(n+1)$ are called as rectangular numbers i.e. product of two consecutive Natural numbers. e.g. 0,2,6,12, ...

Definition 3:(Triangular-Rectangular Numbers/TR numbers) Non negative integers which are simultaneously triangular as well rectangular are called Triangular-Rectangular Numbers. e.g. 0,6, 210, 7140, ...