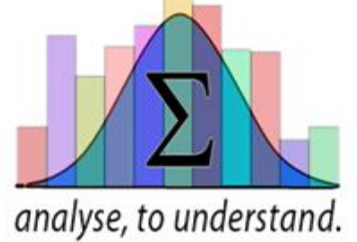




# STAT-SPACE 5



2020-2021

## Sigma Club

### Dept. of Statistics

St. Ann's College for Women

(Autonomous), Affiliated to Osmania University  
Re-accredited with "A+" Grade by NAAC (3<sup>rd</sup> Cycle)  
College with Potential for Excellence by UGC  
Mehdipatnam, Hyderabad-500028



# *Principal's Message*



**Dr. Sr. P. Amrutha**

*“I congratulate the department of Statistics on the release of the fifth issue of **Stat-Space**, wishing them all the best and hope this issue will serve as a good source of knowledge and will go a long way in serving the student community and society to a large extent.”*

*Education is the passport to the future, for tomorrow belongs to those who prepare for it today -Malcom-X*

# Sigma Club

The constant thought of having a common place to interact, was so entrenched in the young minds that a club has been launched under the department, named **SIGMA**. The name of the club come from the most striking feature of Statistics; *Study of Variation* denoted by ' $\sigma$ '.

The club took its original form on 10<sup>th</sup>, September 2016 as an encomium to-THE LIVING LEGEND OF STATISTICS PROFESSOR C.R. RAO, marking his 96<sup>th</sup> birthday.

## Club Objectives

*Bridging the gap by conducting workshops and conferences.*

*Learning by fun through presenting facts and figures*

*Having an open platform to share ideas*

*Publishing **STATSPACE** magazine*

*Tell me and I forget, teach me and I may remember, involve me and I learn." Benjamin Franklin*

## *Courses offered by the department of Statistics*

The department offers statistics courses for the following undergraduate and PG Diploma programs. The department lays equal emphasis on core subject knowledge and hands-on practical training. Regular guest lectures, workshops and invited talks from analytics practitioners are also an important component of the curriculum. The curriculum has been carefully devised by subject experts with inputs from experienced industry professionals.

### **B.Sc. (MSCS)**

Bachelor of Science in Mathematics, Statistics, and Computer Science is a three-year degree programme. Apply and analyze data using concepts of probability, statistical models, sampling theory, experimental designs, statistical quality control, reliability, optimization techniques, Indian official statistics and vital statistics with modern applied statistical tools and techniques both in learning and research. They develop skills for probability concepts and statistical models which are basic for statistical inference for application in many natural phenomenon and also students learn applied statistical techniques which can be used in industry.

### **B.Sc. (MSDS)**

This program has started with Department of Statistics as the nodal department. B.Sc. Data Science is a 3 year full-time course that comes under the domains of Computer Science, Business Analytics and Artificial Intelligence. Theory and applications of statistics is structured to provide knowledge and skills in depth necessary for the employability of students in industry, other organizations, as well as in academics, as science of learning from data.

### **P.G Diploma in Data Analytics**

St Ann's College for Women is the first of its kind in the twin cities and Telugu speaking states, Telangana & Andhra Pradesh to introduce this program. Department of Statistics is the nodal department. This one year diploma program has been designed to meet industry expectations and make the program takers job ready.

### **Other courses offered....**

#### **Career Oriented Course: Advanced MS Excel and R Programming**

An advanced course on MS-Excel and R programming is offered to the students of II Year under Career Orientation Courses which provides students with the knowledge of using MS Excel and R in understanding, analysing and interpreting data.

#### **Inter Disciplinary Course: Basic Statistics and Data Analysis**

Inter Disciplinary Course on Basic Statistics is offered to non-statistics students of III year in their 5<sup>th</sup> Semester to provide them with the basic knowledge of Statistics and Data Analysis which could be helpful in their future career.

# Department Highlights

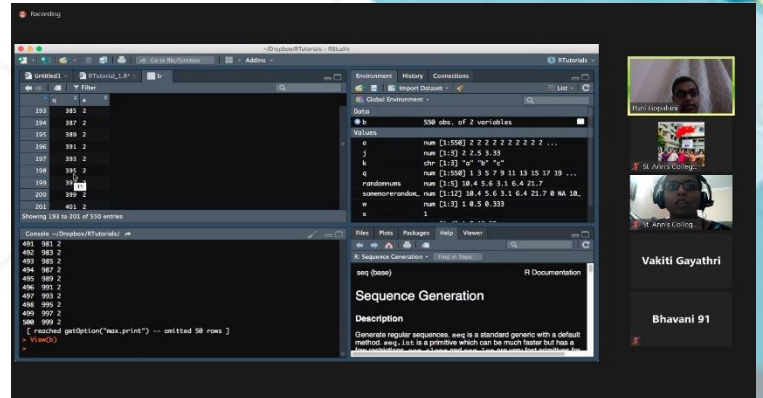
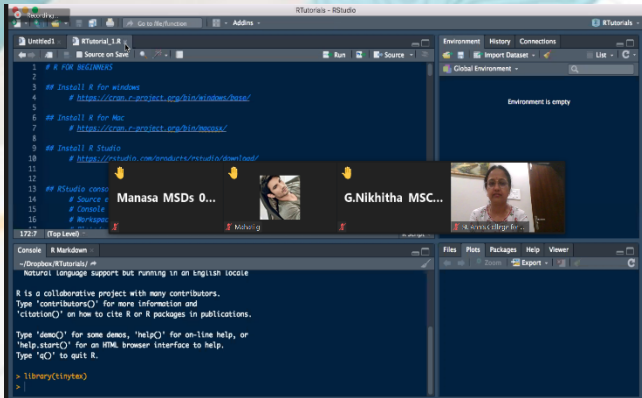
- ❖ The faculty of the department extends the expertise as consultancy in the area of statistical analysis for research projects, publications, M.Phil. & Ph.D. theses for the faculty, students of the institution and to outside researchers too.
- ❖ Ms.Srikala, HoD has co-authored curriculums based textbooks in the subject of Statistics for undergraduate programs, published by Kalyani Publishers, and are in wide circulation. Also edited statistics course material for distance education at Osmania University – PGRRCDE.
- ❖ The members of the department share their knowledge in the subject by being resource persons at various workshops, seminars and guest lectures at different places like NIMS, Engineering Staff College of India (ESCI), Osmania University, C R Rao AIMSCS-UoH Campus, Nizam College, St.Pious College, Andhra Mahila Sabha, etc.
- ❖ The department has an active student club-Sigma Club under which various activities are carried out and it organizes a yearly fest, termed as STATA FEST -numerous academic and fun competitions are organized, which attracts a big number of students from the colleges in twin cities. Also, it brings out an annual department magazine- STAT SPACE which is a compilation of the reports of the mini projects/case studies carried out by students, articles, statistical puzzles, and information on higher education in statistics subject and career prospects.
- ❖ The students of the department are encouraged to participate in various inter-collegiate competitions organized in twin cities and many laurels were brought back to the department.
- ❖ To cultivate the research temper among the students, the faculty encourages the students to participate in national/international conferences, guides and mentors them to present the papers as well and publish as well.
- ❖ The department is proud to have a strong alumni base, doing research in reputed universities/institutes, pursuing careers at different levels in government and private organizations in India and abroad.
- ❖ The department has more than 100 students registered in Youth for Seva (YFS) working as volunteers for different activities organized by YFS.

# Department Activities (2020-2021)

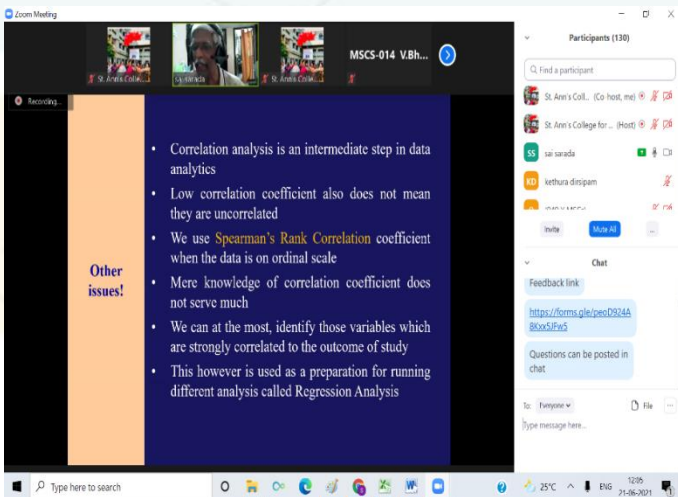
S. No.	Date(s)	Title	Resource Person/ Address
1.	21/12/2020	Applications of Data Science in Excel and R Programming.	Dr. M. Raghunandh Acharya Director, Datakaizen
2.	23/09/2021	7 QC Tools & Six Sigma Approaches	Ms.V.Sai Sarada, (Ph.D), S.V. University, Data Analysis Freelance Consultant
3.	12 /1/ 2021	Orientation Session	Prof .C. Jayalakshmi Chairperson- B.O.S, Dept. of Statistics, O. U, Hyderabad
4.	06/03/2021	Workshop on Overview of Data Analysis Using MS Excel	Dr.D.V.Ramana, Data Science Consultant/Data Strategist, Wissen Infotech, Hyderabad
		<b>Series of Lectures on R</b>	
5.	18/03/2021	R for Beginners	Dr Pani Gopaluni  Nephrologist & general physician, Citizens Hospital, Hyderabad.
6.	25/03/2021	R Programming-Data Frames & Control Statements	
7.	10/6/ 2021	Basics of Data Manipulation using R	
8.	21/6/ 2021	Correlation & Regression with Applications	Dr. K.V.S.Sarma Professor (Rtd), Department of Statistics Sri Venkateswara University, Tirupati
9.	22 /6/ 2021	Coping with the chaos- Staying motivated.	Ms. B. Ramya  Counselling Psychologist.

# Gallery

Webinar on **R for beginners** by Dr Pani Gopaluni (Nephrologist & General Physician, Citizens Hospital, Hyderabad.)



Webinar on **Correlation and Regression with Applications** by Dr. K.V.S.Sarma (Professor (Rtd), Department of Statistics, Sri Venkateswara University Tirupati) and Guest Lecture on **Coping with the Chaos-Staying motivated** by Ms. B. Ramya Counselling Psychologist



Reaching out & Appreciations.....



# Students' Research.....

Students participated in the 2 days National Conference on Women Migrant Workers: Issues and Challenges and presented their papers

## List of Presenters:

1. Ms. G.Mahati
2. Ms. Anjali
3. Ms. Akanksha Talwar
4. Ms.K.Mrudula
5. Ms. Rathnasree
6. Ms. Srilakshmi





# Students' Corner

## *Data Science and its Applications*

Data Science is a hot topic right now. While most of us have already heard about this, every second it is expanding its horizons. In this article we will look at a few of its important applications.

In simple words, data science is the practice of mining large data sets of raw data, both structured and unstructured, to identify patterns and extract actionable insight from them. This is an interdisciplinary field, and the foundations of data science include statistics, inference, computer science, predictive analytics, machine learning algorithm development, and new technologies to gain insights from big data.

**Healthcare:** The biggest application or wonder of Data Science is in Healthcare. With the availability of large datasets of patients, we can use that to build a Data Science approach to identify the diseases at very early stages. Healthcare is one of the biggest sectors for providing opportunities for the professional who can use their medical expertise with Data Science and provide immediate help to the suffering patients. Healthcare provides various other opportunities as well by combining a Data Science approach to identify required organs and their availability in the region of the world.

**Army and Weapons:** Every Nation has built stronger from a stronger army strength. It's a wise man's sayings that power isn't something that should be used for making mankind slaves. It must be used to free mankind from any threats. Justifying the fact Data Science can help in building various automated solutions to identify any attack in a very early stage helping to stop the cause. Other than that Data Science can help in building automated weapons that will be smart enough to identify when to fire and when not to.

**Power and Energy:** With the rapid growth in population the demand for energy has increased exponentially. That requires Nuclear Energy to be handled to such a level that without exhausting the existing Natural Resources we must be capable to provide energy demands fulfilled. Data Science can help in predicting the effects of Nuclear Power sources. Data Science can predict the maximum safest potential. Data Science can help in building AI bots that can easily handle enormous power sources.

**Banking and Finance:** Another aspect of Data Science in the Banking and Finance sector is managing the money effectively to have invested in the right places based on Data Science predictions for best results.

The biggest innovation of time is Cryptocurrency. With cryptocurrency in the market, the demands for managing data online have become a major challenge. Data Science offers various techniques to identify a similar group of people and providing them the best possible security from fraud activities as well.

**Quantum Computing:** The potential for quantum computing and data science is huge in the future. Machine Learning can also process the information much faster with its accelerated learning and advanced capabilities. Based on this, the time required for solving complex problems is significantly reduced. This will boost the health-care industry massively.

Data Science currently does not have a fixed definition due to its vast number of data operations. These data operations will only increase in the future. However, the definition of data science will become more specific and constrained as it will only incorporate essential areas that define the core data science.....

**K.Mrudula B.Sc. (MSCS-II)**

## ***Importance of Statistics and its Application***

Statistics plays a vital role in every field of human activity. Statistics helps in determining the existing position of per capita income, unemployment, population growth rates, housing, schooling medical facilities, etc., in a country.

- (1) Statistics helps in providing a better understanding and accurate description of nature's phenomena.
- (2) Statistics helps in the proper and efficient planning of a statistical inquiry in any field of study.
- (3) Statistics helps in collecting appropriate quantitative data.
- (4) Statistics helps in presenting complex data in a suitable tabular, diagrammatic and graphic form for an easy and clear comprehension of the data.
- (5) Statistics helps in understanding the nature and pattern of variability of a phenomenon through quantitative observations.
- (6) Statistics helps in drawing valid inferences, along with a measure of their reliability about the population parameters from the sample data.

Now statistics holds a central position in almost every field, including industry, commerce, trade, physics, chemistry, economics, mathematics, biology, botany, psychology, astronomy, etc., so the application of statistics is very wide. Now we shall discuss some important fields in which statistics is commonly applied.

### **(1) Business**

Statistics plays an important role in business. A successful businessman must be very quick and accurate in decision making. He knows what his customers want; he should therefore know what to produce and sell and in what quantities.

Statistics helps businessmen to plan production according to the taste of the customers, and the quality of the products can also be checked more efficiently by using statistical methods. Thus, it can be seen that all business activities are based on statistical information. Businessmen can make correct decisions about the location of business, marketing of the products, financial resources, etc.

### **(2) Economics**

Economics largely depends upon statistics. National income accounts are multipurpose indicators for economists and administrators, and statistical methods are used to prepare these accounts. In economics research, statistical methods are used to collect and analyze the data and test hypotheses. The relationship between supply and demand is studied by statistical methods; imports and exports, inflation rates, and per capita income are problems which require a good knowledge of statistics.

### **(3) Mathematics**

Statistics plays a central role in almost all natural and social sciences. The methods used in natural sciences are the most reliable but conclusions drawn from them are only probable because they are based on incomplete evidence.

Statistics helps in describing these measurements more precisely. Statistics is a branch of applied mathematics. A large number of statistical methods like probability averages, dispersions, estimation, etc., is used in mathematics, and different techniques of pure mathematics like integration, differentiation and algebra are used in statistics.

### **(4) Banking**

Statistics plays an important role in banking. Banks make use of statistics for a number of purposes. They work on the principle that everyone who deposits their money with the banks does not withdraw it at the same time.

The bank earns profits out of these deposits by lending it to others on interest. Bankers use statistical approaches based on probability to estimate the number of deposits and their claims for a certain day.

#### **(5) State Management (Administration)**

Statistics is essential to a country. Different governmental policies are based on statistics. Statistical data are now widely used in making all administrative decisions. Suppose if the government wants to revise the pay scales of employees in view of an increase in the cost of living, and statistical methods will be used to determine the rise in the cost of living. The preparation of federal and provincial government budgets mainly depends upon statistics because it helps in estimating the expected expenditures and revenue from different sources. So statistics are the eyes of the administration of the state.

#### **(6) Accounting and Auditing**

Accounting is impossible without exactness. But for decision making purposes, so much precision is not essential; the decision may be made on the basis of approximation, known as statistics. The correction of the values of current assets is made on the basis of the purchasing power of money or its current value.

In auditing, sampling techniques are commonly used. An auditor determines the sample size to be audited on the basis of error.

#### **(7) Natural and Social Sciences**

Statistics plays a vital role in almost all the natural and social sciences. Statistical methods are commonly used for analyzing experiments results, and testing their significance in biology, physics, chemistry, mathematics, meteorology, research, chambers of commerce, sociology, business, public administration, communications and information technology, etc.

#### **(8) Astronomy**

Astronomy is one of the oldest branches of statistical study; it deals with the measurement of distance, and sizes, masses and densities of heavenly bodies by means of observations. During these measurements errors are unavoidable, so the most probable measurements are found by using statistical methods.

**Example:** This distance of the moon from the earth is measured. Since history, astronomers have been using statistical methods like method of least squares to find the movements of stars.

Akanksha Talwar

**B.Sc. (MSCS-II)**

## *Creative View of Statistics; Stats Rhymes .....*

### Satisfaction

I can't get no satisfaction,  
I can't get no satisfaction.  
'Cause I try and I try and I try and I try.  
I can't get no, I can't get no.  
When I'm sitting down at lecture,  
And that man begins to explain to me  
That you must pay close attention  
When you're fitting regression  
To heteroscedasticity!  
I can't get no, oh no no no.  
Hey hey hey, that's what I say.  
I can't get no satisfaction,  
I can't get no satisfaction.  
'Cause I try and I try and I try and I try.  
I can't get no, I can't get no.  
When I'm working on my homework,  
And I'm filled with great uncertainty,  
So I choose the pooled procedure,  
And my teacher points and laughs at me  
'Cause our p-values don't agree!  
I can't get no, oh no no no.  
Hey hey hey, that's what I say.  
I can't get no satisfaction,  
I can't get no satisfaction.  
'Cause I try and I try and I try and I try.  
I can't get no, I can't get no.  
When I'm handed my diploma  
For my hard earned Bachelor's degree,  
And the Dean says I cannot leave  
Until I give an explanation  
How to compute a correlation.  
I can't get no, oh no no no.  
Hey hey hey, that's what I say.  
I can't get no satisfaction,

I can't get no satisfaction. Cause I try and I try and  
I try and I try.  
Cause I try and I try and I try and I try.  
I can't get no, I can't get no.

### Probability Man

Hey Probability Man, flip a coin for me,  
I don't study and I never really learned how to.  
Hey Probability Man, roll those dice for me,  
as you're walking to your classroom I'll come  
following you.  
Help me take the steps to compute a cdf,  
calculate a pmf, to derive an mgf,  
and take limits from the left, just learning terms  
won't help my understanding.  
How hard can it be to integrate a density,  
or to calculate a mean, or infer what is not seen,  
I promise to learn Calculus.  
Hey Probability Man, pick a card for me,  
I don't study and I never really learned how to.  
Hey Probability Man, spin that wheel for me,  
as you're walking to your classroom I'll come  
following you.  
My memory is gone when the process is Poisson,  
or even Gaussian; my transforming is undone  
with the wrong Jacobian, my mind's made up,  
I need to understand you.  
Teach me all you know, teach me now I cannot  
wait  
to learn how to correlate, or when one should  
integrate,  
I want to learn everything.  
Hey Probability Man, flip a coin for me,  
I don't study and I never really learned how to.  
Hey Probability Man, roll those dice for me,  
as you're walking to your classroom I'll come  
following you

# Higher Education

Statisticians use mathematical techniques to analyze and interpret data and draw conclusions. One can find a career in statistical profession by doing activities such as solving problems in a wide variety of fields and apply mathematical and statistical knowledge to social, economic problems. Careers that incorporate statistics can be found in a wide variety of disciplines. These candidates can also apply for the Indian Statistical Service, Civil Service and Indian Economic Service exams.

## Post Graduate/Diploma Programs

- Indian Statistical Institute  
(M.Stat, M.Math, M.S(QMS) and few Diploma Programs.
  - Chennai Mathematical Institute  
(M.Sc. Maths)
  - Institute of Mathematical Sciences,  
Chennai (integrated M.Sc., PhD)
  - IITs
  - Central Universities
  - Courses in Cryptography
  - Pune University (MSc. Statistics)
  - Osmania, Madras, Delhi and many other Universities
- Data Analytics Courses
  - P.G/PH.D in Population studies(IIPS)
  - Masters in Demography-University of Kerala
  - IIPH(Masters in Public Health)
  - Christ University and few other private universities – M.Sc. Data Science
  - P.G/Diplomas in Actuarial Courses
  - Actuaries Courses

# Career Prospects

## JOB AREAS

IT Industry, Census, Ecological, Medical, Election, Crime, Education, Film, Cricket, Tourism Etc.

## JOB TITLES

Statistical Officer, Statisticians, Business Analyst, Mathematician, Professor, Risk Analyst, Data Analyst, Content Analyst, Statistics Trainer, Data Scientist, Consultant, Biostatistician etc

## *Public and Private Sectors*

- *Actuary*
  - *Data Scientists/Data Analytics*
  - *Big Data Analysis*
  - *Demand Analysts & HR Analysts*
  - *Risk Managers*
  - *Cryptographers*
  - *Biostatisticians-Pharmaceutical Industries , Software Industries*
  - *Financial Statisticians*
  - *Demographers*
  - *Data Journalism*
  - *Indian Statistical Service*
  - *DSIM-Reserve Bank of India*
  - *Statistical Officer (SO)*
  - *Textile Committee*
- And many more.....*

## Activity Corner

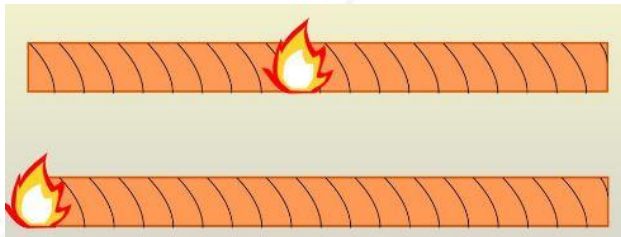
Q1. There are 100 black socks and 100 white socks mixed up in a drawer. If you have to pick socks blindly from the drawer, how many socks do you need to take out to be sure that you have a matching pair of socks?



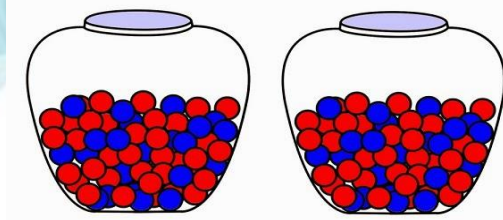
2Q. There are two sand timers which show 4 minutes and 7 minutes respectively. What would be the best approach to get a time of 9 minutes using both the sand timers, at one time or one after another or in any other combination?



3Q) There are two ropes and a lighter. Each rope takes exactly 60 minutes to burn completely. But the ropes do not burn at a constant rate, so you do not know that half the rope burns in 30 minutes. For instance, if one end of the rope is lit, it may take 5 minutes to burn the first half of it, and 55 minutes to burn the second half. How can you measure exactly 45 minutes by burning the ropes?



4Q) There are 2 jars with 50 red marbles and 50 blue marbles. You need to place all the marbles into the jars in such a way that if you blindly pick one marble out of the jar, there are maximum chances of it being red. While picking, you will first randomly pick a jar and then randomly pick a marble out of that jar. You can arrange the marbles however you like, but each marble must be in a jar.



5. Varun and Abhi play a game with two dice. But they do not use the numbers. Some of the faces are painted red and the others blue. Each player throws the dice in turn. Varun wins when the two top faces are the same color. Abhi wins when the colors are different. Their chances are even. The first die has 5 red faces and 1 blue face. How many red and how many blue are there on the second die?



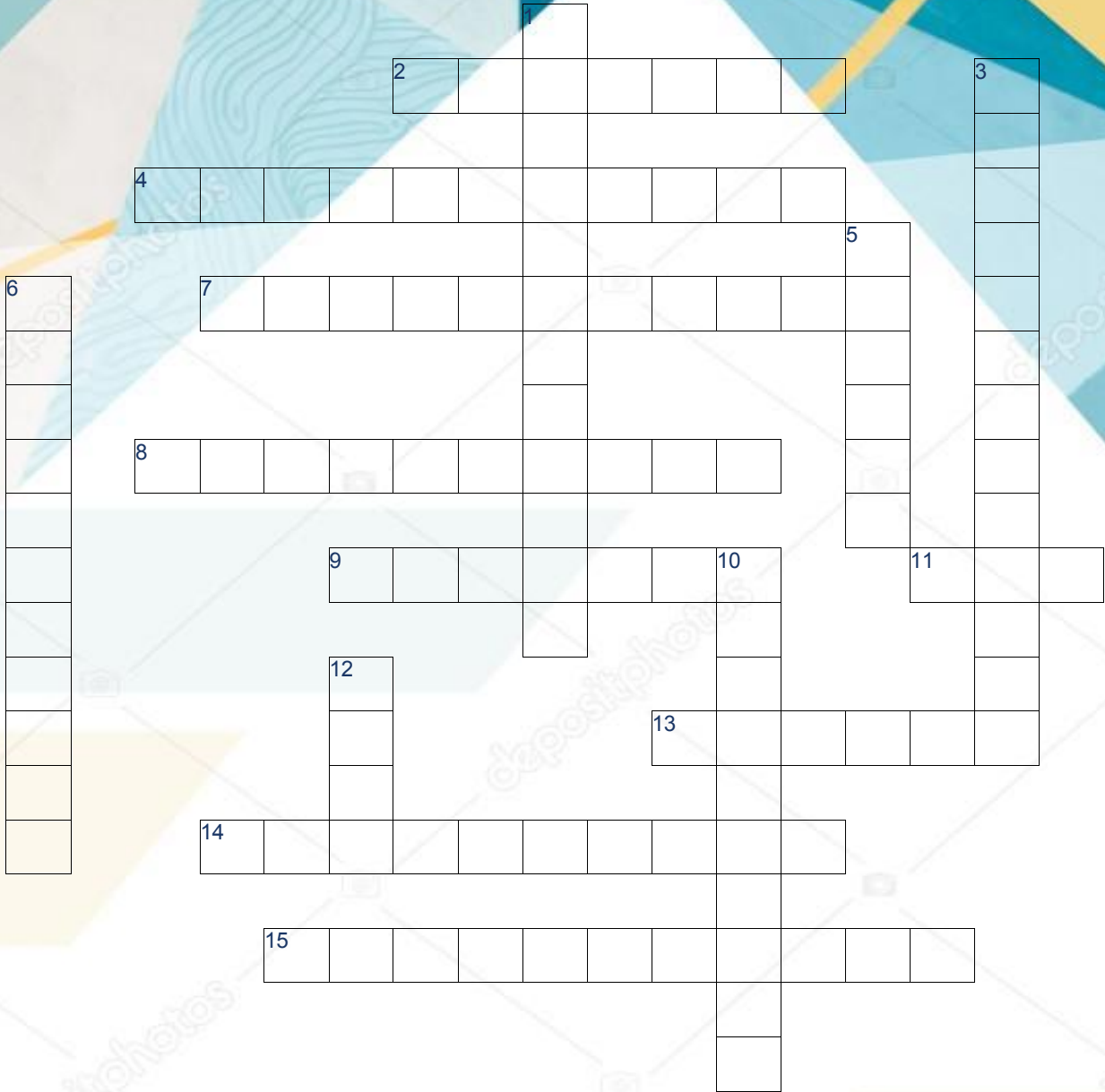
6. A line of 100 airline passengers is waiting to board a plane. They each hold a ticket to one of the 100 seats on that flight. (For convenience, let's say that the  $n$ th passenger in line has a ticket for the seat number  $n$ .)

Unfortunately, the first person in line is crazy, and will ignore the seat number on their ticket, picking a random seat to occupy. All of the other passengers are quite normal, and will go to their proper seat unless it is already occupied. If it is occupied, they will then find a free seat to sit in, at random. What is the probability that the last (100th) person to board the plane will sit in their proper seat?

**Answer 1 : 3 socks , 3 : 45, 4 : 75%, 5 : (3 Red ,3 Blue), 6 : 0.50**



## Statistics Vocabulary Puzzle



### Across

2. All form some
4. Assume, deduce, decide
7. All the data that you can see
8. The entire group
9. A study using the sample
11. Simple Random Survey
13. Smaller group from the survey
14. A survey using a system
15. Numbers and things that go into a category

### Down

1. Can do meaningful math
3. The people that were missed by your means of survey
5. A study using the entire population
6. The worst kind of survey
10. Some from all
12. Favoritism

### Crossword

(1. Quantitative 2. Cluster 3. Undercoverage 4. Inferential 5. Census 6. convenience 7. Descriptive 8. Population 9. Surveys 10. Stratified 11. SRS 12. Bias 13. Sample 14. Systematic 15. Categorical)



### **Faculty**

Ms. D.Srikala HoD  
Ms. V.Sai Sri Kishore  
Ms.V.Sai Sarada  
Ms.B.Deepika

### **Sigma Club Cabinet Members**

President : Neha  
Vice President :K.Mrudula  
Secretary : Y.Anjali  
Assistant Secretary : Akanksha Talwar

### **Editorial Club**

Akanksha Talwar  
K.Mrudula  
Sanjana  
Vidhi Tiwari

**Contact : [annstats1987@gmail.com](mailto:annstats1987@gmail.com)**