A Study of Birthday Pattern of School Students using Statistical Measures

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Abstract: ***The tradition of celebrating the day of birth of an individual is thought to have existed since the ancient times. Depending on the culture, religious beliefs, and the geographic location, occasions for ritual performance differ greatly. The problem is to determine that the birthday of randomly selected group of people have uniformly distributed. If one assumes for simplicity that a year contains 365 days and that days are distributed in to twelve months and each month is equally likely to be the birthday month of a randomly selected person, then in a group of people there are twelve possible combinations of birthdays. In this study we collect the information through questionnaires and collected data are analyzed using statistical measures and our study shows that the birthday pattern is not uniform over the months of the year.***

Keywords: Graphical Representation, Chi-square test, Level of significance

1. Introduction

A birthday is the anniversary of the birth of a person, or figuratively of an institution. Birthdays of people are celebrated in numerous cultures, often with birthday gifts, birthday cards, a birthday party, or a rite of passage. In probability theory, the birthday problem or birthday paradox concerns the probability that, in a set of n randomly chosen people, some pair of them will have the same birthday. The goal is to compute P(A), the probability that the birthday of people in the group have uniformly distributed. These conclusions are based on the assumption that each day of the year is equally probable for a birthday. Actual birth records show that different numbers of people are born on different days. Real-world applications for the birthday problem include a cryptographic attack called the birthday attack, which uses this probabilistic model to reduce the complexity of finding a collision for a hash function, as well as calculating the approximate risk of a hash collision existing within the hashes of a given size of population. The history of the problem is obscure. The result has been attributed to Harold Davenport. However, a version of what is considered today to be the birthday problem was proposed earlier by Richard von Mises. In this study we collect the primary data of the students in Kolhapur High School. The data contains student age, height, weight, marks, occupation of parents, cast, birthdates etc. and statistical tools are apply for analysis

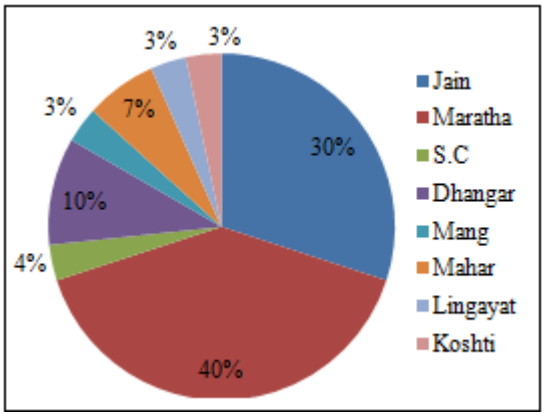
Software Used: MS – EXCEL

Statistical Tools:

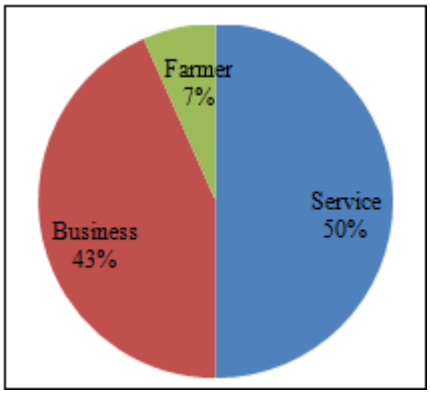
1) Bar diagrams
2) Frequency Distribution
3) Measure of Central Tendency
4) Measure of Dispersion
5) Scatter Plot
6) Chi- Square test For goodness of fit

Graphical Representation:

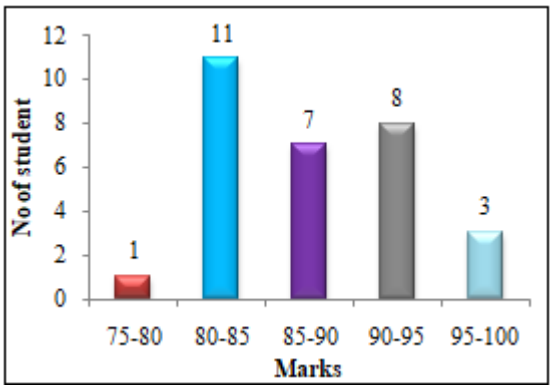
Category	*No. of Student*
Jain	9
Maratha	12
S.C	1
Dhangar	3
Mang	1
Mahar	2
Lingayat	1
Koshti	1



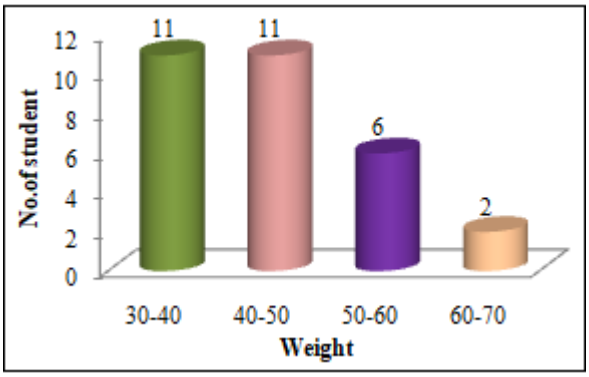
Criteria	No. of Parents
Service	15
Business	13
Farmer	2



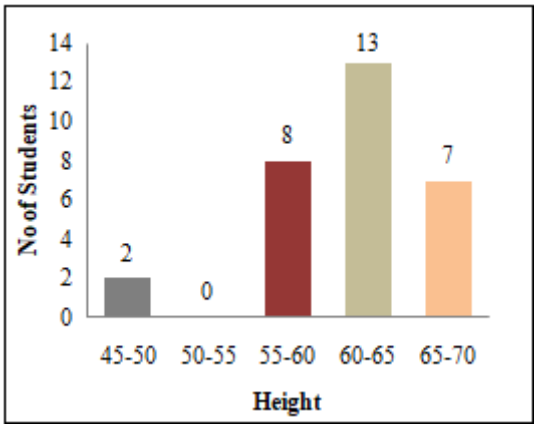
Marks	*No. of Student*
75-80	1
80-85	11
85-90	7
90-95	8
95-100	3



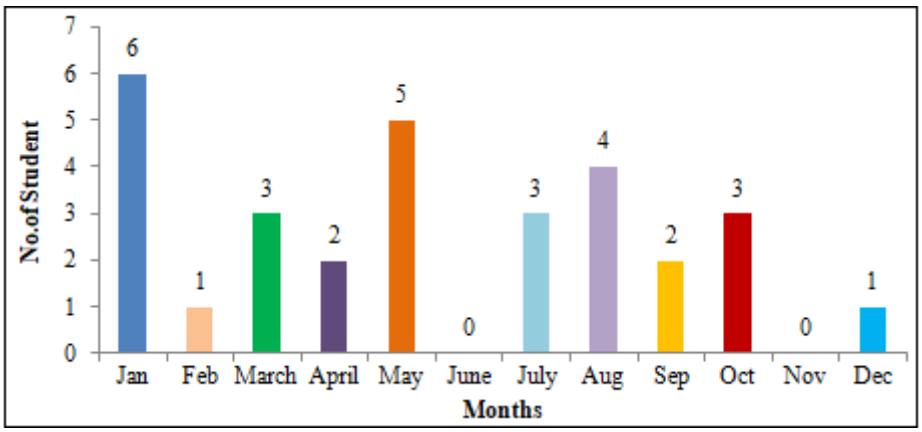
Weight	No. of student
30-40	11
40-50	11
50-60	6
60-70	2

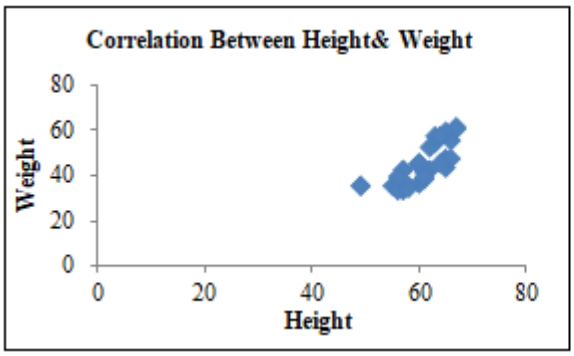


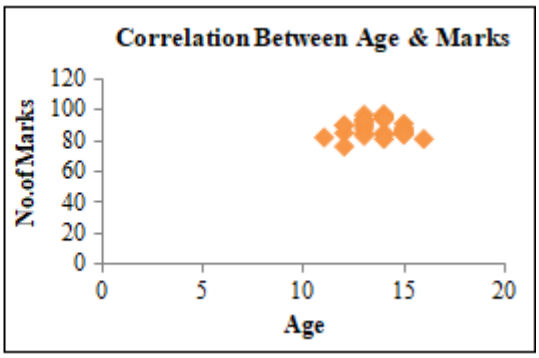
Height	No .of Student
45-50	2
50-55	0
55-60	8
60-65	13
65-70	7



Month	No. of Student
Jan	6
Feb	1
March	3
April	2
May	5
June	0
July	3
Aug	4
Sep	2
Oct	3
Nov	0
Dec	1







Testing of hypothesis:

Hypothesis:

H_0: The births are not uniformly distributed.
H_1: The births are uniformly distributed.

2. Observation Table

Months	No. of Students	Probability	Expected Value	O_i^2/E_i
Jan	6	0.083	2.5	14.4
Feb	1	0.083	2.5	0.4
Mar	3	0.083	2.5	3.6
April	2	0.083	2.5	1.86
May	5	0.083	2.5	10
June	0	0.083	2.5	0
July	3	0.083	2.5	3.6
Aug	4	0.083	2.5	6.4
Sep	2	0.083	2.5	1.6
Oct	3	0.083	2.5	3.6
Nov	0	0.083	2.5	0
Dec	1	0.083	2.5	0.4
				45.86

Test statistic:

$$\chi^2_{cal} = \sum \left(\frac{O_i^2}{E_i}\right) - N$$

$= 45.6 - 30$

$= 15.6$

$$\chi^2_{k-1 \text{ at } 5\% \text{ l.o.s.}}$$

$$= \chi^2_{12-1,5\%}$$

$$= \chi^2_{11,5\%}$$

$=19.675$

Conclusion: $\chi^2_{cal} < \chi^2_{tab}$

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We accept H_0 i.e. The Birth are not Uniformly Distributed.

3. Major Finding

The respondent students are majority belong to Maratha category than Jain. The 43% parents are belonging to business and 50 % parents are belonging service and only 7% parents belong to farmer category and marks of all students distinction. 43% students height is 60-65 inches approximately 37% students weights are 30to 40 and 40to50 kg there is positive correlation between height and weight of the student and birthday pattern of students birthday over month is not uniformly distributed.

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