Probability and Statistics Assignment number 1

probability and statistics for engineering and the sciences (National University of Computer and Emerging Sciences)

National University of Computer and Emerging Sciences

(Islamabad Campus)

Department of Computer Science

Probability and Statistics

Assignment 1

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Problem #1

Solution:

Rectangle:

Calculating percentages of Leo satellites

Government = $\frac{229}{502} \times 100 = 45.61\%$

Military = $\frac{109}{502} \times 100 = 21.71\%$

Commercial = $\frac{118}{502} \times 100 = 23.50\%$

Civil = $\frac{46}{502} \times 100 = 9.16\%$

Percentages for Geo are

Government = 13.65%

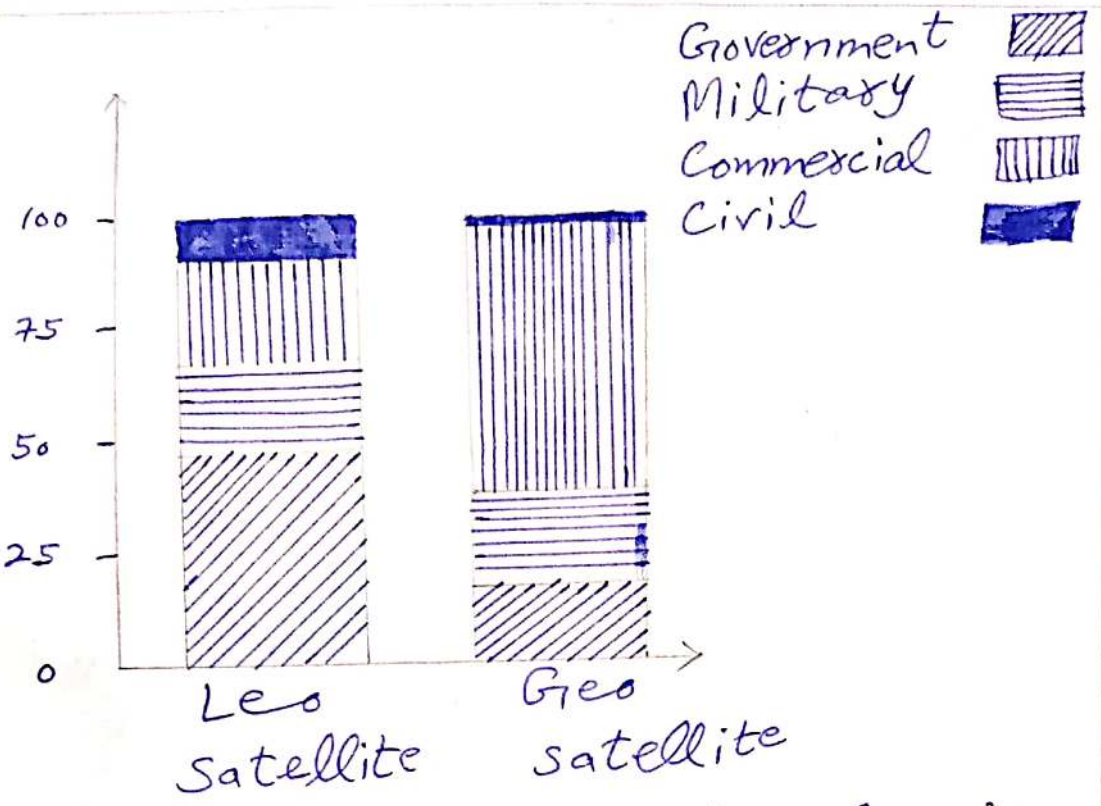
Military = 21.06%

Commercial = 65.04%

Civil = 0.23%

Breadth proportion = 502 : 432

= 251 : 216



Here length of rectangle is 100 and breadth = 251:216

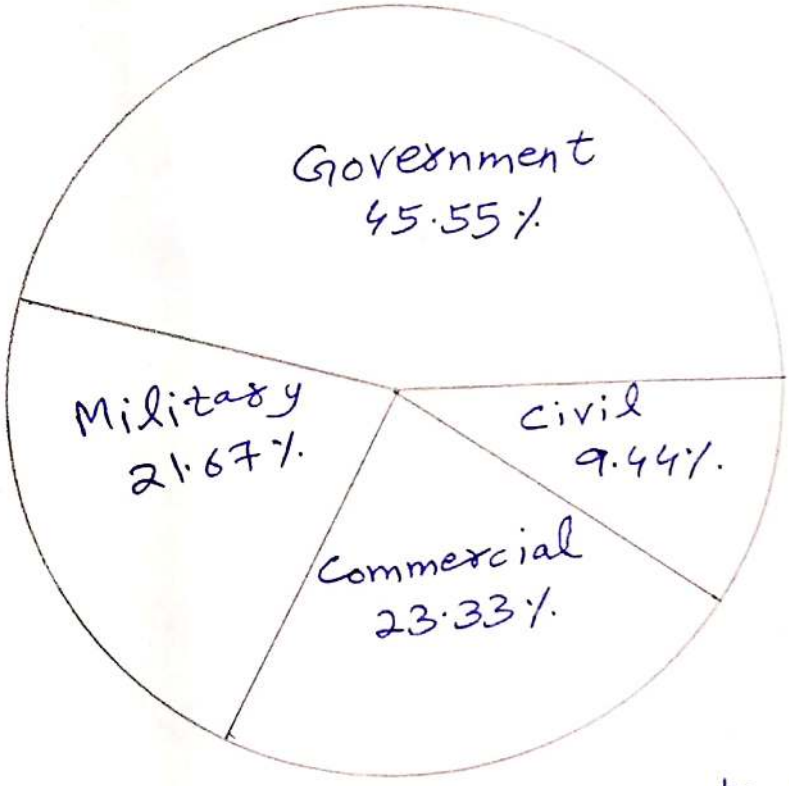
As theit is no big difference b/w widths so they are looking same but reetangle of geo satellite has slightly smaller breadth.

Pie chart:

We have to calculate angles for each sector.

For Leo satellites

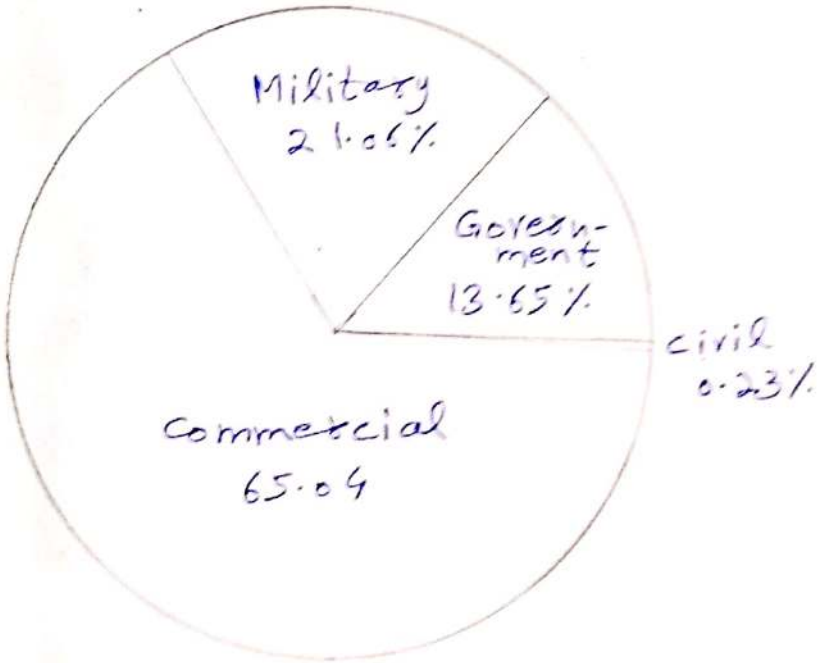
Ownership Sectors	Leo Satellites	Angle of Sectors (degrees)	%
Government	229	$\frac{229}{502} \times 360 = 164$	45.55
Military	109	$\frac{109}{502} \times 360 = 78$ (242)	21.67
Commercial	118	$\frac{118}{502} \times 360 = 84$ (326)	23.33
Civil	46	$\frac{46}{502} \times 360 = 34$ (360)	9.44
Total	502	360	99.99



Pie chart for Leo satellites

For Geo Satellites

Ownership sectors	Geo Satellites	Angles of sectors (degrees)	%
Goverment	59	$\frac{59}{432} \times 360 = 49.16$	13.65
Military	91	$\frac{91}{432} \times 360 = 75.83$ (124.99)	21.06
Commercial	281	$\frac{281}{432} \times 360 = 234.16$ (359.15)	65.04
Civil	1	$\frac{1}{432} \times 360 = 0.83$ (359.98)	0.23
Total	432	359.98	99.98



Pie chart for Geo satellites

Observations:

Division of Leo and Geo satellite among different sectors is already shown using pie charts

But percentage of leo and geo satellites in single/every sector are given by

Ownership sectors	Geo satellites	Leo satellites	Total
Government	229 (79.51%)	59 (20.48%)	288 (100%)
Military	109 (54.5%)	91 (45.5%)	200 (100%)
Commercial	118 (29.57%)	281 (70.42%)	399 (100%)
civil	46 (97.87%)	1 (2.12%)	47 (100%)

These data shows that there are total of 934 satellites with this distribution:

Government = 30.83%

Military = 21.41%

Commercial = 42.71 %.

Civil = 5.02 %.

This shows that maximum satellites are owned by commercial sectors and minimum satellites are owned by civil sector.

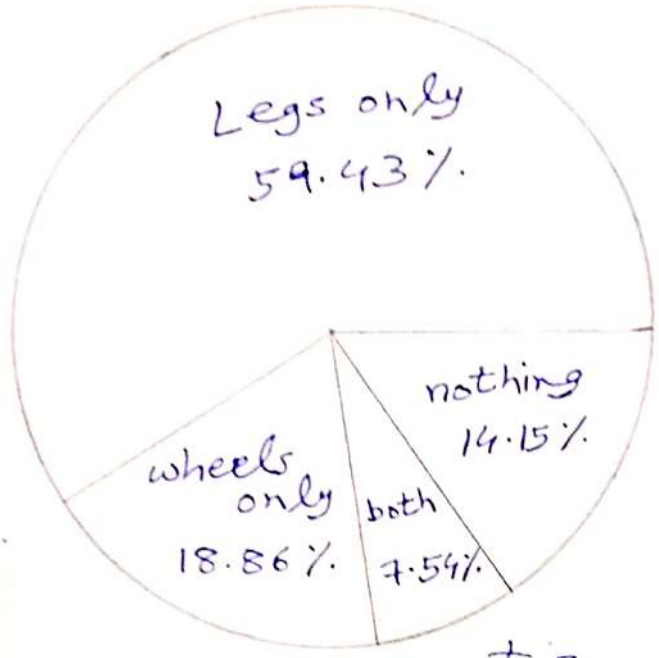
Problem #2

Solution:

Types of robots	No. of robots	Angle of sector (degrees)	%
Legs only	63	$\frac{63}{106} \times 360 = 213.96$	59.43
wheels only	20	$\frac{20}{106} \times 360 = 67.92$ (281.88)	18.86
both	8	$\frac{8}{106} \times 360 = 27.16$ (309.04)	7.54
nothing	15	$\frac{15}{106} \times 360 = 50.94$ (359.98)	14.15
Total	106	359.98	99.98

~~Conclusion:~~

Pie chart:



Pie chart for robots

Conclusion:

According to this web search maximum robots are with legs only and minimum are having both.

They have percentages 59.43% and 7.54% respectively.

means that maximum robots can only walk and minimum can walk and roll both.

Problem #3

Solution:

Collecting data:

These are maximum temperature of a city for 50 days (in °C)

28	28	31	29	35	33	28	31	34
29	25	27	29	33	30	31	32	26
26	21	21	20	22	24	28	30	34
33	35	29	23	21	20	19	19	18
19	17	20	19	18	18	19	27	17
18	20	21	18	19				

(i)

Frequency distribution:

Minimum value = 17

Maximum value = 35

Range = 35 - 17 = 18

Let

number of classes = 5

width of each class = 4

Class limits	Class boundries	Tally	Frequency
17-20	16.5-20.5	𝍸 𝍸 𝍸 II	17
21-24	20.5-24.5	𝍸 II	7
25-28	24.5-28.5	𝍸 𝍸	10
29-32	28.5-32.5	𝍸 IIII	9
33-36	32.5-36.5	𝍸 II	7
			50

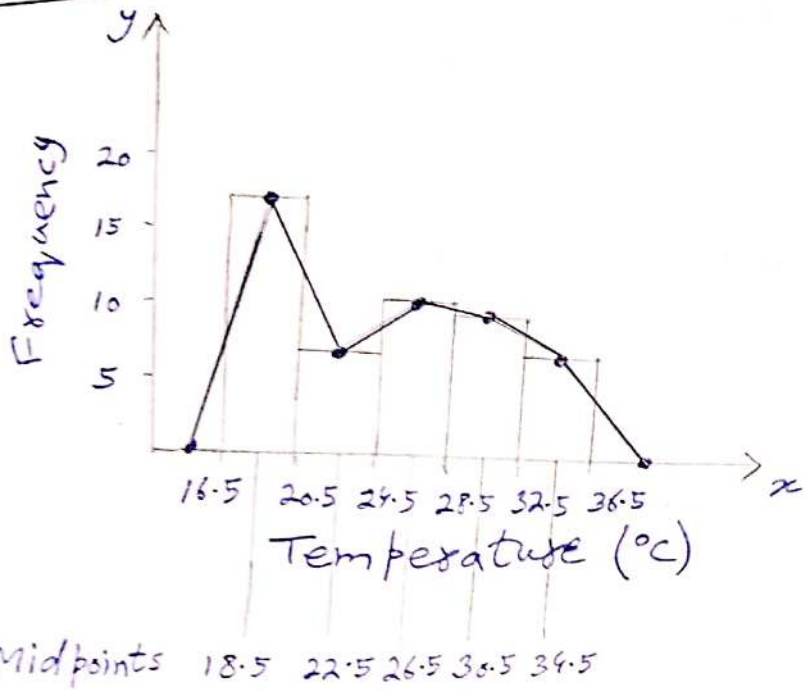
(ii)

Midpoint, relative and cumulative frequencies:

Class limits	Frequency	Midpoint	Relative frequency	Cumulative frequency
17-20	17	18.5	0.34	17
21-24	7	22.5	0.14	24
25-28	10	26.5	0.20	34
29-32	9	30.5	0.18	43
33-36	7	34.5	0.14	50

(iii)

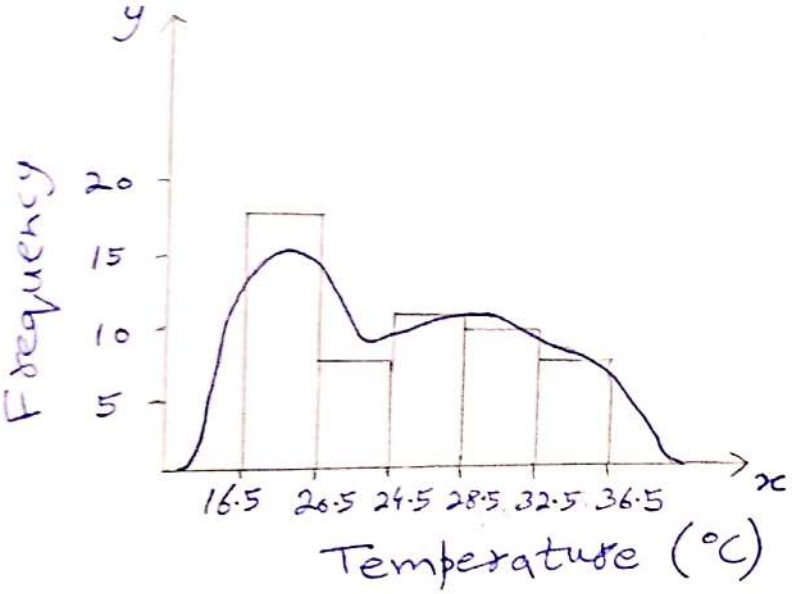
Histogram: and Frequency Polygon



Midpoints 18.5 22.5 26.5 30.5 34.5

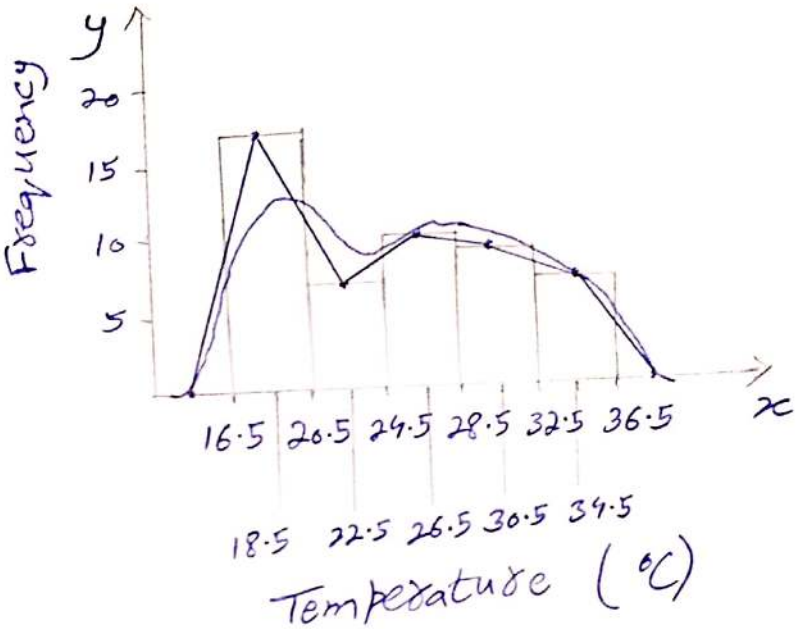
(iv)

Histogram and density curve



(v)

Histogram, density curve and frequency polygon



(vi)

Ogive: