

Descriptive Statistics

The following figures represent the age of these samples of 60 Employees of the firm.

Arrange P.C Company.

35, 44, 56, 83, 46, 20, 32, 19, 50, 39, 33, 37,
 42, 40, 20, 25, 34, 52, 27, 18, 40, 23, 17, 41, 22, 45
 21, 34, 49, 27, 60, 46 ✓ 32, 58, 23, 52, 24, 64, 41,
 47, 54, 37, 40, 41, 40, 36, 46, 29, 34, 39, 39,
 40, 37, 50, 41, 34, 47, 34, 45, 36.

- 1) Display age, capacity, & histogram with Normal curve.
- 2) Add another variable gender, assign, first 40 employees male & rest as female.
- 3) Histogram of age male.
- 4) Histogram of age female.
- 5) Find out the mean, S.D., median, maximum, minimum & range of age of employees.
- 6) Display gender using pie-chart with Percentage as a table.

Descriptive Statistics.

Aim:-

To analyze the age distribution of employees in a company using SPSS performing descriptive statistical analysis and visualize the data through histograms and piechart.

Algorithm:-

Step 1: Open SPSS and go to "variable view" and define following variable age & gender
(Numeric 1 = Male, 2 = female).

Step 2: Switch to "Data view" and enter the assign data.

Step 3: Assign the first 40 employees as male 1 and the remaining 20 as female (2)

Step 4: Go to Graphs → Legacy Dialogue the variable click ok to generate.

Step 5: Go to Graphs → Legacy Displays → Histograms select age and use gender as filter click ok to generate separate Histogram.

Step 6: Go to analyse → Descriptive → Statistical explore.

~~Step 7: Move age to dependent list and gender to the factor list and Click "ok" to get Mean, S.D., Median, Minimum, Maximum & Range.~~

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File Edit View Insert Options Data Transform Graphs Utilities Help

Variable 3 of 5 Variables

	AGE	GENDER
1	35	2
2	44	2
3	64	2
4	63	2
5	45	2
6	25	2
7	32	2
8	13	2
9	60	2
10	38	2
11	33	2
12	37	2
13	42	2
14	40	2
15	38	2
16	35	1
17	34	2
18	52	2
19	27	2
20	22	2
21	65	2
22	40	2

+ Frequencies

Statistics

Variable	Age	Gender
All	Missing	0
Mean	38.58	1.07
Median	39.00	2.00
Std. Deviation	12.467	.475
Range	66	1
Minimum	13	1
Maximum	63	2

IBM SPSS Statistics Processor is ready.

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Data View Variable View

Item	Name	Type	Format	Labels
1	AGE	Scale	0.000	
2	GENDER	Nominal	0	Male
3	AGECATQ	Nominal	0	Female

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File Edit View Insert Options Data Transform Graphs Utilities Help

Data View Variable View

Item	AGE	GENDER	AGECATQ
1	35	2	0
2	44	2	0
3	64	2	0
4	63	2	0
5	45	2	0
6	25	2	0
7	32	2	0
8	13	2	0
9	60	2	0
10	38	2	0
11	33	2	0
12	37	2	0
13	42	2	0
14	40	2	0
15	38	2	0
16	35	1	1
17	34	2	0
18	52	2	0
19	27	2	0
20	22	2	0
21	65	2	0
22	40	2	0

IBM SPSS Statistics Processor is ready.

File Edit View Insert Options Data Transform Graphs Utilities Help

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Statistics

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Minimum	13	1
Maximum	63	2

Frequency Table

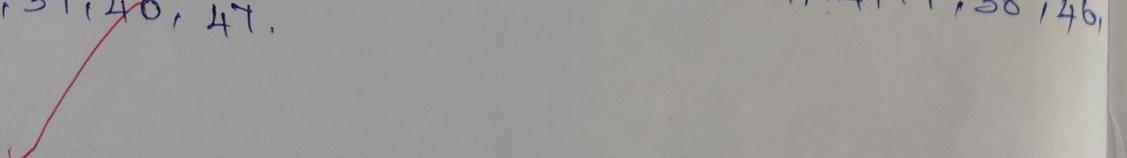
AGE	Frequency	Percent
17	1	1.2
18	1	1.2
19	1	1.2
20	2	3.3

4.2.1
17/2
✓

One-Sample T-Test

The wheel co. is about to introduce a new line of tyres for racing bicycle by promising 36 km avg running without failure of tyres. Following is a list of how far the 100 bicycles got (to the nearest 100 km) before one of the tyres failed to meet minimum standards. Test whether the bicycle selected by for the study is from wheel co. or not.

38, 24, 12, 36, 41, 40, 45, 41, 40, 47, 26, 15, 48, 44, 29, 43, 28, 29, 37, 10, 37, 45, 29, 31, 23, 49, 41, 27, 41, 42, 61, 40, 40, 45, 37, 55, 47, 42, 28, 28, 38, 48, 18, 16, 39, 50, 14, 52, 33, 38, 51, 10, 49, 21, 44, 31, 43, 34, 49, 48, 28, 39, 28, 39, 28, 36, 56, 54, 39, 31, 35, 36, 32, 20, 54, 39, 31, 35, 36, 32, 26, 54, 25, 39, 44, 25, 42, 50, 22, 9, 34, 32, 34, 42, 40, 43, 32, 30, 51, 20, 29, 14, 19, 38, 46, 46, 39, 40, 47.



One-Sample T-Test

2025/02/01

Aim:

To Compute one sample t test for given data

H₀: The sample of 100 tyre are not taken from wheels
Co. of 36 km avg. running without failure.

H₁: The sample of 100 tyre are not taken from wheels i.e.
Co. of 36 km avg. running without failure.

Procedure :

Step 1: To start SPSS

Start → programs → SPSS for windows → 16.0 SPSS for windows

Step 2: To create a data base

File → New → Data.

Step 3: Select variable view and create variable kilometer.

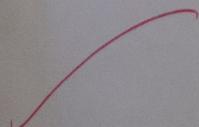
Step 4: To begin the one sample T-test.

Step 5:

Analyse → Compare means → one-sample test.

Step 5: The one sample t-test dialogue box appears.

Select test variable as kilometer and test value as 36 with 95% confidential interval. To continue choose "ok" button to get the output.



Ex. No: 3.

24/08/2025

Independent Samples T-Test.

A sample of 25 youth is taken into consideration for studying the cell phone usage. The average monthly minutes spoken by the people are given. Check whether there is significant difference in the average monthly minutes of male and female.

monthly minutes

904	801	899	398	625	480	617	817	560
685	582	797	224	12	412	509	452	309

Gender

M	M	F	F	F	M	F	F	M
M	F	F	M					

Monthly minutes

601	568	565	613	485	390	617	690	309
315	553	398						

Gender

M	F	M	M	F	M	M	F	F
M	F	F						

E1 No: 3
29/08/2025

Independent Samples T-Test

AIM

The independent samples T Test compares the mean scores of two groups on a given variable.

H_0 : There is no significant difference in the mean monthly minute spoken by male and female.

H_1 : There is a significant difference in the mean monthly minute spoken by male and female.

Procedure

Step 1: Open the SPSS

Step 2: In Variable view enter name as monthly minutes and measure scale and create another one as gender also measure as scale.

Step 3: In Data view enter the monthly minutes and denote gender as 1-male, 2-Female.

Step 4: Go to Analysis \rightarrow Compare Means \rightarrow Independent sample test transfer the average monthly minutes to test variables and grouping variable gender (1 & 2) and click ok.

Paired Sample T-Test

A health spa company want to test, whether weight reducing program has a significant impact on reducing the weight to the participant in the program the data of weight of the participants before and after the weight reducing program as given.

Weight Before	189	202	220	207	197	177	193	202
Weight After	170	179	203	192	172	161	174	187
	186	204						

Paired Sample T-test

Aim :-

Paired Sample t-test is a statistical technique that is used to compare two population before and after the ~~to~~ in the case of two sample that are correlated.

H₀: There is no significant difference in the weight of the participant before & after the program.

H₁: There is a significant difference in the weight of the participant before and after the program.

Procedure :-

Step 1 : Open the database , say AGILITY.

Step 2 : To begin the analysis.

\$ Analyze → compare means → paired Sample t-test.

Step 3: Select variable view & enter the given variable and data .

Step 4:- To begin the Paired sample T-test .

Analyze → compare means → Paired Sample T-test.

Step 5:- The paired sample t-test dialogue box appears select pair 1 and 2.

✓ To continue choose 'OK' button to get the output.

Output :-

Result :-

Paired Sample T-test was
Computed successfully.

~~ment after t-test, we see how much difference in the
between all 3 possible treatments is
present. purf. bro
treatment shows 0.2009 as significant treatment~~

Result :- r1 r2 01

Step 1: Start step by start SPSS programs →

r1 1000 02 Statistics → f8n SPSS Statistic
r2 0P

05 ~~Code for variable name pp mark reward &
other names are remained a variable
drug treatments & assign measure as 1=1
then give the value of drug-treatment as
1=monkey drug 2= place 3= no treated~~

Step 2: Enter data in data view

Step 3: Analyse → compare means → one way ANOVA
Step 4: Then mark mark reward to dependent
Step 5: Then mark drug treatment to independent
Step 6: Then mark group to factor

One way ANOVA using SPSS.

Students were given three different drug treatments before revising for their exams. The marks scored by the students in percentage and drugs used are given. Test whether there is significant difference in the marks scored and drug treatment.

Memory Drug	Placebo	No treatment
70	87	9
77	43	10
83	50	14
90	57	33
97	63	30

Ex. No: 5
06/03/2025

One way ANOVA using SPSS.

Aim:-

To perform one way ANOVA for given data.

Hypothesis.

H₀: There is no significant difference in the marks scored and drug treatment.

H₁: There is significant difference in the marks scored and drug treatment.

Procedure :-

Step 1 :- Start SPSS by start → All programs → IBM SPSS Statistics → IBM SPSS Statistics 20

Step 2 :- Create two variable named mark scored & assign measure as nominal & variable drug-treatments & assign measure as scale then give the value of drug-treatment as 1 = memory drug 2 = place BO 3 = no treatment

Step 3 :- Enter data in data view.

Step 4 :- Analyse → compare means → one way ANOVA

Step 5 :- Then move mark scored to dependent list and drug-treatment to factor → OK

Step 6 /:- Post hoc → Duncan → continue → OK.

Result :-

reduces the number of parallel steps
narrative & the learning using multiple
methods was different than
multiple methods & in groups

30 min	5 minutes	1 minute	
83	48	52	1 narrators
22	28	PL	2 narrators
82	08	22	8 narrators

display test of ANOVA show out narrators on
with no begin and narrators have 30 min
learning multiple methods & in

Result :-

One-way ANOVA using SPSS was
computed successfully.

Ex. No: 6

10/3/2025

Two way Anova Using SPSS

Problem:

The following table represents the number of defective pieces produced by 3 workmen operating in 3 different machines.

	Machine 1	Machine 2	Machine 3
Workman 1	27	34	23
Workman 2	29	32	25
Workman 3	22	30	22

Perform two-way ANOVA to test whether machine and workman have impact on the no. of defective product produced.

Ex. No. 6
10/3/2025

Two way Anova Using SPSS

Aim:-

To perform two-way anova for the given data using SPSS.

Hypothesis :-

H_0 : There is no significant difference in the defects for the different combination of workman and machine.

H_1 : There is significant difference in the defects for the different combination of workman & machine.

Procedure :-

1) Create workman , machine , number of defects on variable view and set workman value as "workman 1 = 1", "workman 2 = 2", "workman 3 = 3" and set machine value as "1= machine 1", "2= machine 2", "3= machine 3".

2) Then go to data view and set the value as workman , machine and no. of machine .

3) Select analyze menu \rightarrow general linear model \rightarrow univariate

A) Univariate dialogue box → select dependent variable and fixed factor.

5) To click 'OK' to get output.

Result.

	df	sum_sq	mean_sq	F	p_value	method
1	2	82	41	13	8	Levene's test
2	2	21	10.5	4.5	81	Welch's test
3	2	21	10.5	4.5	81	ANOVA F
4	2	21	10.5	4.5	81	ANOVA S
5	2	21	10.5	4.5	81	ANOVA T
6	2	21	10.5	4.5	81	ANOVA H
7	2	21	10.5	4.5	81	ANOVA O
8	2	21	10.5	4.5	81	ANOVA G
9	2	21	10.5	4.5	81	ANOVA W
10	2	21	10.5	4.5	81	ANOVA B
11	2	21	10.5	4.5	81	ANOVA R
12	2	21	10.5	4.5	81	ANOVA D
13	2	21	10.5	4.5	81	ANOVA E
14	2	21	10.5	4.5	81	ANOVA M
15	2	21	10.5	4.5	81	ANOVA N
16	2	21	10.5	4.5	81	ANOVA K
17	2	21	10.5	4.5	81	ANOVA L
18	2	21	10.5	4.5	81	ANOVA P
19	2	21	10.5	4.5	81	ANOVA Q
20	2	21	10.5	4.5	81	ANOVA S
21	2	21	10.5	4.5	81	ANOVA V
22	2	21	10.5	4.5	81	ANOVA X
23	2	21	10.5	4.5	81	ANOVA Y
24	2	21	10.5	4.5	81	ANOVA Z
25	2	21	10.5	4.5	81	ANOVA A
26	2	21	10.5	4.5	81	ANOVA C
27	2	21	10.5	4.5	81	ANOVA F
28	2	21	10.5	4.5	81	ANOVA G
29	2	21	10.5	4.5	81	ANOVA H
30	2	21	10.5	4.5	81	ANOVA I
31	2	21	10.5	4.5	81	ANOVA J
32	2	21	10.5	4.5	81	ANOVA K
33	2	21	10.5	4.5	81	ANOVA L
34	2	21	10.5	4.5	81	ANOVA M
35	2	21	10.5	4.5	81	ANOVA N
36	2	21	10.5	4.5	81	ANOVA O
37	2	21	10.5	4.5	81	ANOVA P
38	2	21	10.5	4.5	81	ANOVA Q
39	2	21	10.5	4.5	81	ANOVA R
40	2	21	10.5	4.5	81	ANOVA S
41	2	21	10.5	4.5	81	ANOVA T
42	2	21	10.5	4.5	81	ANOVA U
43	2	21	10.5	4.5	81	ANOVA V
44	2	21	10.5	4.5	81	ANOVA W
45	2	21	10.5	4.5	81	ANOVA X
46	2	21	10.5	4.5	81	ANOVA Y
47	2	21	10.5	4.5	81	ANOVA Z
48	2	21	10.5	4.5	81	ANOVA A
49	2	21	10.5	4.5	81	ANOVA B
50	2	21	10.5	4.5	81	ANOVA C
51	2	21	10.5	4.5	81	ANOVA D
52	2	21	10.5	4.5	81	ANOVA E
53	2	21	10.5	4.5	81	ANOVA F
54	2	21	10.5	4.5	81	ANOVA G
55	2	21	10.5	4.5	81	ANOVA H
56	2	21	10.5	4.5	81	ANOVA I
57	2	21	10.5	4.5	81	ANOVA J
58	2	21	10.5	4.5	81	ANOVA K
59	2	21	10.5	4.5	81	ANOVA L
60	2	21	10.5	4.5	81	ANOVA M
61	2	21	10.5	4.5	81	ANOVA N
62	2	21	10.5	4.5	81	ANOVA O
63	2	21	10.5	4.5	81	ANOVA P
64	2	21	10.5	4.5	81	ANOVA Q
65	2	21	10.5	4.5	81	ANOVA R
66	2	21	10.5	4.5	81	ANOVA S
67	2	21	10.5	4.5	81	ANOVA T
68	2	21	10.5	4.5	81	ANOVA U
69	2	21	10.5	4.5	81	ANOVA V
70	2	21	10.5	4.5	81	ANOVA W
71	2	21	10.5	4.5	81	ANOVA X
72	2	21	10.5	4.5	81	ANOVA Y
73	2	21	10.5	4.5	81	ANOVA Z
74	2	21	10.5	4.5	81	ANOVA A
75	2	21	10.5	4.5	81	ANOVA B
76	2	21	10.5	4.5	81	ANOVA C
77	2	21	10.5	4.5	81	ANOVA D
78	2	21	10.5	4.5	81	ANOVA E
79	2	21	10.5	4.5	81	ANOVA F
80	2	21	10.5	4.5	81	ANOVA G
81	2	21	10.5	4.5	81	ANOVA H
82	2	21	10.5	4.5	81	ANOVA I
83	2	21	10.5	4.5	81	ANOVA J
84	2	21	10.5	4.5	81	ANOVA K
85	2	21	10.5	4.5	81	ANOVA L
86	2	21	10.5	4.5	81	ANOVA M
87	2	21	10.5	4.5	81	ANOVA N
88	2	21	10.5	4.5	81	ANOVA O
89	2	21	10.5	4.5	81	ANOVA P
90	2	21	10.5	4.5	81	ANOVA Q
91	2	21	10.5	4.5	81	ANOVA R
92	2	21	10.5	4.5	81	ANOVA S
93	2	21	10.5	4.5	81	ANOVA T
94	2	21	10.5	4.5	81	ANOVA U
95	2	21	10.5	4.5	81	ANOVA V
96	2	21	10.5	4.5	81	ANOVA W
97	2	21	10.5	4.5	81	ANOVA X
98	2	21	10.5	4.5	81	ANOVA Y
99	2	21	10.5	4.5	81	ANOVA Z
100	2	21	10.5	4.5	81	ANOVA A
101	2	21	10.5	4.5	81	ANOVA B
102	2	21	10.5	4.5	81	ANOVA C
103	2	21	10.5	4.5	81	ANOVA D
104	2	21	10.5	4.5	81	ANOVA E
105	2	21	10.5	4.5	81	ANOVA F
106	2	21	10.5	4.5	81	ANOVA G
107	2	21	10.5	4.5	81	ANOVA H
108	2	21	10.5	4.5	81	ANOVA I
109	2	21	10.5	4.5	81	ANOVA J
110	2	21	10.5	4.5	81	ANOVA K
111	2	21	10.5	4.5	81	ANOVA L
112	2	21	10.5	4.5	81	ANOVA M
113	2	21	10.5	4.5	81	ANOVA N
114	2	21	10.5	4.5	81	ANOVA O
115	2	21	10.5	4.5	81	ANOVA P
116	2	21	10.5	4.5	81	ANOVA Q
117	2	21	10.5	4.5	81	ANOVA R
118	2	21	10.5	4.5	81	ANOVA S
119	2	21	10.5	4.5	81	ANOVA T
120	2	21	10.5	4.5	81	ANOVA U
121	2	21	10.5	4.5	81	ANOVA V
122	2	21	10.5	4.5	81	ANOVA W
123	2	21	10.5	4.5	81	ANOVA X
124	2	21	10.5	4.5	81	ANOVA Y
125	2	21	10.5	4.5	81	ANOVA Z
126	2	21	10.5	4.5	81	ANOVA A
127	2	21	10.5	4.5	81	ANOVA B
128	2	21	10.5	4.5	81	ANOVA C
129	2	21	10.5	4.5	81	ANOVA D
130	2	21	10.5	4.5	81	ANOVA E
131	2	21	10.5	4.5	81	ANOVA F
132	2	21	10.5	4.5	81	ANOVA G
133	2	21	10.5	4.5	81	ANOVA H
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136	2	21	10.5	4.5	81	ANOVA K
137	2	21	10.5	4.5	81	ANOVA L
138	2	21	10.5	4.5	81	ANOVA M
139	2	21	10.5	4.5	81	ANOVA N
140	2	21	10.5	4.5	81	ANOVA O
141	2	21	10.5	4.5	81	ANOVA P
142	2	21	10.5	4.5	81	ANOVA Q
143	2	21	10.5	4.5	81	ANOVA R
144	2	21	10.5	4.5	81	ANOVA S
145	2	21	10.5	4.5	81	ANOVA T
146	2	21	10.5	4.5	81	ANOVA U
147	2	21	10.5	4.5	81	ANOVA V
148	2	21	10.5	4.5	81	ANOVA W
149	2	21	10.5	4.5	81	ANOVA X
150	2	21	10.5	4.5	81	ANOVA Y
151	2	21	10.5	4.5	81	ANOVA Z
152	2	21	10.5	4.5	81	ANOVA A
153	2	21	10.5	4.5	81	ANOVA B
154	2	21	10.5	4.5	81	ANOVA C
155	2	21	10.5	4.5	81	ANOVA D
156	2	21	10.5	4.5	81	ANOVA E
157	2	21	10.5	4.5	81	ANOVA F
158	2	21	10.5	4.5	81	ANOVA G
159	2	21	10.5	4.5	81	ANOVA H
160	2	21	10.5	4.5	81	ANOVA I
161	2	21	10.5	4.5	81	ANOVA J
162	2	21	10.5	4.5	81	ANOVA K
163	2	21	10.5	4.5	81	ANOVA L
164	2	21	10.5	4.5	81	ANOVA M
165	2	21	10.5	4.5	81	ANOVA N
166	2	21	10.5	4.5	81	ANOVA O
167	2	21	10.5	4.5	81	ANOVA P
168	2	21	10.5	4.5	81	ANOVA Q
169	2	21	10.5	4.5	81	ANOVA R
170	2	21	10.5	4.5	81	ANOVA S
171	2	21	10.5	4.5	81	ANOVA T
172	2	21	10.5	4.5	81	ANOVA U
173	2	21	10.5	4.5	81	ANOVA V
174	2	21	10.5	4.5	81	ANOVA W
175	2	21	10.5	4.5	81	ANOVA X
176	2	21	10.5	4.5	81	ANOVA Y
177	2	21	10.5	4.5	81	ANOVA Z
178	2	21	10.5	4.5	81	ANOVA A
179	2	21	10.5	4.5	81	ANOVA B
180	2	21	10.5	4.5	81	ANOVA C
181	2	21	10.5	4.5	81	ANOVA D
182	2	21	10.5	4.5	81	ANOVA E
183	2	21	10.5	4.5	81	ANOVA F
184	2	21	10.5	4.5	81	ANOVA G
185	2	21	10.5	4.5	81	ANOVA H
186	2	21	10.5	4.5	81	ANOVA I
187	2	21	10.5	4.5	81	ANOVA J
188	2	21	10.5	4.5	81	ANOVA K
189	2	21	10.5	4.5	81	ANOVA L
190	2	21	10.5	4.5	81	ANOVA M
191	2	21	10.5	4.5	81	ANOVA N
192	2	21	10.5	4.5	81	ANOVA O
193	2	21	10.5	4.5	81	ANOVA P
194	2	21	10.5	4.5	81	ANOVA Q
195	2	21	10.5	4.5	81	ANOVA R
196	2	21	10.5	4.5	81	ANOVA S
197	2	21	10.5	4.5	81	ANOVA T
198	2	21	10.5	4.5	81	ANOVA U
199	2	21	10.5	4.5	81	ANOVA V
200	2	21	10.5	4.5	81	ANOVA W
201	2	21	10.5	4.5	81	ANOVA X
202	2	21	10.5	4.5	81	ANOVA Y
203	2	21	10.5	4.5	81	ANOVA Z
204	2	21	10.5	4.5	81	ANOVA A
205	2	21	10.5	4.5	81	ANOVA B
206	2	21	10.5	4.5	81	ANOVA C
207	2	21	10.5	4.5	81	ANOVA D
208	2	21	10.5	4.5	81	ANOVA E
209	2	21	10.5	4.5	81	ANOVA F
210	2	21	10.5	4.5	81	ANOVA G
211	2	21	10.5	4.5	81	ANOVA H
212	2	21	10.5	4.5</td		

chi-Square Test using SPSS

Problem:

Use chi-square test to find relationship between source of information of product A and experience of the respondent in this work life use in the product. Give your inference.

Source Experience	Friends relatives	Agent	Ads	Exhibi- tion	Total
Up to 5 years	8	4	23	9	44
6 - 10	18	4	12	12	46
11 - 15	3	3	24	12	42
16 - 20	2	3	6	4	15
21 - 25	8	3	6	14	31
Above 25	1	1	6	14	22
Total	40	18	77	65	200

What was new about these new out

Chi-Square Test Using SPSS

Aim:-

To analyze chi-square Test for two variables by using SPSS

H_0 : There is no significant association in the experience and source of information.

H_1 : There is significant association in the experience and source of information.

Procedure :-

Step 1: Open the SPSS.

Step 2: In variable view in source enter the value tables as,

Friends relatives

Agent

Advertisement

Exhibition

Experience.

Enter the value tables as 1 to 5 years, 6 to 10 yrs
11 to 15 yrs, 16 to 20 yrs & 21 to 25 years.

Step 3: Then in data view enter source value according to count value (e.g) count = 8,

Experience = 1 and source = 1.

Step 4: Select Data \rightarrow weight cases \rightarrow and transfer the count to frequency variable.

Without pleasure for reward enter

Step 5:- Analyze \rightarrow Descriptive Statistics \rightarrow

Cross tabs \rightarrow Experience (Row) \rightarrow Information (Column) \rightarrow Statistics \rightarrow Chi-square and click ok.

	freq	bases	value	value	prop	
p102	020	11	1.521	P.101	0.020	
p.011	080	81	8.801	8.81	0.080	
p.002	2.800	81	8.781	8.781	0.020	
d.102	2.800	41	8.781	8.781	0.100	
2.802	000	21	1.521	P.101	0.000	
P.002	010	21	P.011	0.011	0.010	
P.101	210	21	1.521	2.11	0.100	
P.101	210	21	1.521	2.11	0.100	
P.101	210	21	1.521	2.11	0.100	
2.802	000	81	8.781	8.781	0.000	
2.802	000	81	8.781	8.781	0.000	
1.520	1.520	02	P.8A1	P.8A1	0.020	

Result :-

Chi-Square Test using SPSS was computed successfully.

b) A real estate is typically re-assessed annually for the property tax purpose. The assessed value however not necessarily the same as the fair market value of property. The table summarizes the value of 30 properties recently sold in mid-western city. Both variables are measured in 1000's of dollars.

Property	Sales Price	Assessed Value	Prop. -erty	S.P	A.V
1	167.9	152.7	11	230	225.4
2	168	163.8	12	230	170.4
3	155	167.6	13	222.5	200.4
4	158.5	127.3	14	222.5	209.6
5	159.9	155.7	15	220	205.2
6	162	169	16	216	220.9
7	165	189.1	17	215	194.9
8	174.5	153.6	18	228	231.9
9	175	167.1	19	209	224.2
10	159	148.9	20	267	235.1

AIM:-

To carryout correlation analysis to find our relationship between two variable using SPSS

H_0 : There is no significant relationship

between sales price and assessed value

H_1 : There is significant relationship between sales price and assessed value.

Algorithm:

Step 1: To start SPSS Start \rightarrow program \rightarrow SPSS window \rightarrow 16.0 SPSS for windows.

Step 2: Enter two variable sales price and assessed value in data view.

Step 3: Enter the sales price and assessed value in variable view.

Step 4: Next click on Analyse \rightarrow Descriptive \rightarrow Frequency \rightarrow charts \rightarrow Histograms \rightarrow click on continue and press ok.

Step 5: After click on Analyse \rightarrow correlate \rightarrow Bivariate (here it is regarding relationship so choose correlation).

Result:-

Correlation and regression analysis using SPSS was computed successfully.

Multiple Regression Analysis

Multiple Regression Analysis.

Aim:

To carryout regression analysis to find out the relationship among variables using SPSS.

Procedure:

Step 1: To start SPSS, Start \rightarrow programs \rightarrow SPSS for windows \rightarrow 16.0 SPSS for windows.

Step 2: Enter two variables sales price and assessed value in data view.

Step 3: Enter the Dose, Blood pressure and recovery time in variable view

Step 4: Next click on Analyze \rightarrow Regression \rightarrow linear \rightarrow Dependent & Independent variable \rightarrow OK.

Step 5: Graphs \rightarrow Legacy Dialogs \rightarrow Scatter/Dot \rightarrow Choose simple scatter \rightarrow Define \rightarrow Full X & Y Axis \rightarrow To click 'OK' to get output

Result:

Thus the multiple regressions have been computed successfully.

Kruskal-Wallis Test**Aim:-**

To find out the machine values using the Kruskal-Wallis test analysis.

Procedure:-

Step 1: Start \rightarrow All programs \rightarrow IBM SPSS \rightarrow File \rightarrow New \rightarrow Data

Step 2: Select variable view \rightarrow Create variables.

Step 3: Select Data view \rightarrow Enter data in the Data view.

Step 4: Select Analyze menu \rightarrow Non-parametric test \rightarrow Legacy Dialogs \rightarrow K Independent Sample Test

Step 5: K Independent Sample Test Dialog Box \rightarrow select test variable and grouping variable.

Step 6: Mention maximum and minimum limit in Define Groups option.

Step 7: Click 'options' \rightarrow select Descriptives \rightarrow Continue.

Step 8: Select test type "Kruskal-Wallis H Test" \rightarrow To click 'ok' to get the output.

Mann Whitney Test.

Aim:-

To find out the bounced cheque using the mann-whitney test.

Procedure:-

Step 1: Start \rightarrow All programs \rightarrow IBM SPSS \rightarrow File \rightarrow New \rightarrow Data.

Step 2: Select variable view \rightarrow Create variables.

Step 3: Select data view \rightarrow enter data in the data view.

Step 4: Select Analyse menu \rightarrow non parametric test
 \rightarrow legacy dialogs \rightarrow Independent Samples.

Step 5: \rightarrow Independent samples dialog box \rightarrow
Select test variable and grouping.

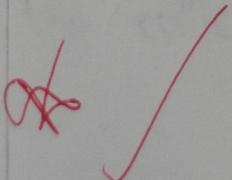
Step 6: Mention maximum and minimum limit
in define groups option.

Step 7: Click options \rightarrow select descriptive \rightarrow
continue.

Step 8: Select test type "Mann Whitney U Test"
 \rightarrow To click ok to get the output.

Result :-

Mann Whitney U-Test is successful.



Wilcoxon Signed Rank Test.

Aim:

Create before training & after training analysis fit with in wilcoxon signed rank test using SPSS.

Procedure:

Step 1: Start \rightarrow all programs \rightarrow IBM SPSS

\rightarrow File \rightarrow New \rightarrow Data.

Step 2: Select variable view \rightarrow Create variables.

Step 3: Select data view \rightarrow enter data in the data view.

Step 4: Select analyse menu \rightarrow non-parametric test \rightarrow legacy dialogs \rightarrow 2 related samples.

Step 5: 2 related samples Dialog Box \rightarrow Select test variables.

Step 6: Click options \rightarrow select descriptives \rightarrow continue.

Step 7: Select Test type wilcoxon \rightarrow To click OK to get the output.

Result: Mean ran level on before and after

training values are found by using for the wilcoxon method.

Investment Appraisal using Excel

A small wonders Ltd is a small manufacturing of micro computers. The board of directors of the firm is fixed with the problem of evaluating four proposals & deciding which if any of the alternatives are acceptable. The table shows the projected available capital (Rs 8000) over the next four years cash inflows & outflows. Positive cash outflows are shown in red. The cost of capital is assumed as 15% P/A.

Proposal	Year 1	Year 2	Year 3	Year 4
1	-60	100	140	70
2	50	-30	50	100
3	-40	80	100	90
4	100	110	110	150
Capital available for years	100	100	50	50

You are requested to choose any one based on NPV.

Investment Appraisal using Excel.

Aim:-

To find NPV for different proposals
and rank the investment proposals.

Procedure:-

Step 1: Start all programs \rightarrow ms office \rightarrow MS Excel.Step 2: Open sheet 1 \rightarrow enter the column A value
for (proportional cost of capital, year 1,
year 2, year 3, year 4) enter values
entered.Step 3: Find the NPV value using formula
 $=NPV(b_1, b_2, b_3, b_4, b_5, b_6)$ \rightarrow click
enter.Step 4: See the NPV value to select the cell
amount click left mouse button go to
format cells.

Step 5: Currency go to symbols select INR ok.

Step 6: Discover the rank for all NPV value

Step 7: Select b8 (=rank (select NPV values) select

Step 7: Select ascending or descending variable.

Step 8: Find the output.

Result:-

Investment appraisal has been ranked
using MS Excel.

OK /

Ex. No: 14

Calculation of Interest rate for the Loan.

A person availed a loan of Rs. 1 lakh
that is to be repaid in 48 monthly
installments of Rs. 3000 each. Find
the rate of interest charged on the loan.

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installments of Rs. 3000 each. Find
the rate of interest charged on the loan.

Ex. No: 14. Calculation of interest rate
Long term for the loan.

Aim: Calculate interest rate for the long term loan

using excel

Procedure:

- 1) Create loans as first cell and put values as 1 Lakh.
- 2) Create no. of periods as 2nd cell and value as 98
- 3) Create EMI as 3rd cell and put value as 3000
- 4) Go to formula function \rightarrow insert function \rightarrow select \rightarrow financial \rightarrow select RATE.
- 5) Assign nper as 48, pmt as -3000 pr as 1 lakh.
- 6) Click ok.
- 7) Right click the answer \rightarrow format cell \rightarrow percentage \rightarrow ok.
- 8) In the fifth row, type =A4*12.
- 9) The output will appear.

Result:-

Interest rate for the loan is calculated for the given data.

Ex. No: 15
Calculation of Internal rate of Return (IRR) using Excel.

Assume that the initial investment of 100,000 results in 12 annual cash flow as given below.

1820	1500	1800	-	1240	1600	1400
0	0	2000	0	0	0	0
1645	1769	1769	1655	1650	1220	
0	0	0	0	0	0	0

Calculate Internal rate of Return (IRR).

IRR = 10% (approx)

IRR = 10% (approx)

IRR = 10% (approx)

IRR = 10% (approx)

Ex. No: 15

Calculation of IRR using Excel.

Aim: If we invest money in a project, we want to know the rate of return.

To calculate internal rate of return using excel.

Procedure:-

- 1) Type initial investment as -1,00,000.
- 2) Set values for income 1,2,...,120 as, 13200, 15000, ..., 12000 respectively.
- 3) Click formulas \rightarrow insert functions \rightarrow financial \rightarrow IRR.
- 4) Set values from B1 to B13.
- 5) Click OK.
- 6) The output will appear.

Result:-

Internal rate of return has been

calculated for the given data.

Ex. No: 16 Calculation of EMI Using Excel.

A person gets a loan from the bank of Rs. 200000 at annual interest rate of 14%. The loan has to be repaid in 15 years in equally monthly installments. Find out EMI.

Ex. No: 16. Calculation of EMI Using Excel.

Aim

To calculate the EMI for the given problem.

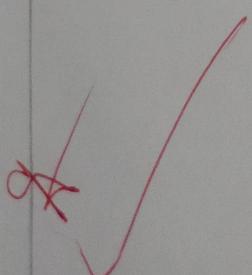
Procedure.

- 1) Start all programs - Microsoft Office Excel
- 2) Sheet one under the column A1 create loan and A2 rate, A3 & no. of years,
- 3) Enter the values 2000, 0.14/12 and 15 in cells B1, B2 and B3 respectively.
 - i. A₁,
 - ii. Loan - INR 2000.00
 - iii. Rate .14 %
 - iv. No. of years 15.

- 4) Go to insert function \rightarrow choose financial \rightarrow PMT \rightarrow then type variables \rightarrow ok \rightarrow the result will appear.

Result :-

Calculation of the EMI using excel for the given problem has been performed successfully.



Ex. No: 17

Calculation of Compound interest using Excel.

You deposit Rs. 1000 each and every month in your bank account. The bank pays 12% annual rate that is compound every month. Find out how much money will be in your account at the end of 24 months.

Ex. No: 17

Calculation of Compound Interest using Excel.

Aim

To perform compound interest for the given information using excel.

Procedure :-

- 1) Start \rightarrow All program \rightarrow MS office \rightarrow MS Excel.
- 2) Type number of periods, monthly payment and interest rate on A₁, A₂ and A₃ resp.
- 3) Type 24,1000 and 0.12/12 on B₁, B₂ and B₃.
- 4) Click \rightarrow Formula tab \rightarrow Insert Function \rightarrow choose financial and select FV function.

Result :-

Thus the compound interest for the given information has been completed successfully.

OK ✓

Ex. No.: 18

Solving LPP by Graphical and Simplex method.

Aim:-

To solve Linear programming graphical &
Simplex method problem using TORA.

Procedure:-

- 1) Start \rightarrow run \rightarrow TORA
- 2) Select Linear programming from main menu.
- 3) Click "GOTO INPUT SCREEN".
- 4) Give problem title number of variables and
- 5) no. of constraints then press ENTER.
- 6) Give problem fill input grid by using
following data object function,
- 7) $\text{Max } Z = 3X_1 + 4X_2$
- 8) Constraints $= 6X_1 + 4X_2 \leq 24$
- 9) $X_1 + 2X_2 = 6$
- 10) For Graphical method click solve menu \rightarrow solve
problem \rightarrow graphical.
- 11) For final solution click solves menu \rightarrow solve
problem \rightarrow algebraic \rightarrow final solution.
- 12) For specific method of solving choose any
one of M Method, 2-phase method etc.,
- 13) Then write the solution and close TORA.

Result :-

Thus the solution for the given LPP is
solved by Graphical and Simplex method
using TORA.

Transportation Problem.

Aim:-

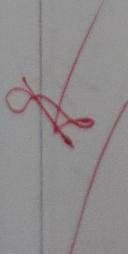
To solve the transportation problem to determine the optimum cost.

Procedure :-

- 1) Start
- 2) Click on Start Button \rightarrow All programs \rightarrow TORA.
- 3) Go to main menu and select transportation problem.
- 4) Select name and the number of source and destination for given problem
- 5) Enter the given information.

Result :-

Thus the transportation problem has been solved successfully.



Assignment problem using
TORA.

Aim:-

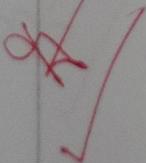
To perform solving assignment for the given data.

Procedure:-

- 1) Select \rightarrow All program \rightarrow TORA
- 2) Select 'click here at start'.
- 3) Select Transportation model.
- 4) Enter title and input 3 for no. of destination & no. of sources.
- 5) Press TAB button input Grid \rightarrow Transportation page will appear. Input the data in respective box.
- 6) Assign 1 for supply and demand for all operator and job.
- 7) Click solve menu. Save the problem.
- 8) Select solve problem \rightarrow Final Solution.
- 9) Output will appear.

Result :-

The assignment problem has been performed successfully.



Assignment problem using
POM.

Aim:-

To find out optimum solution for assignment problem using POM.

Procedure:-

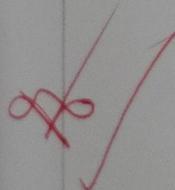
- 1) Start \rightarrow POM.
- 2) Select module from Main menu of Assignment
- 3) Give the 'Number of objects to be filled.'
- 4) Fill Input Grid using the following data:

	A	B	C	D
1	10	25	15	20
2	15	30	5	15
3	35	20	12	24
4	14	25	24	20

- 5) ~~Select problem~~ ^{solve} Select problem

Result:-

Thus the solution for the assignment problem is derived.



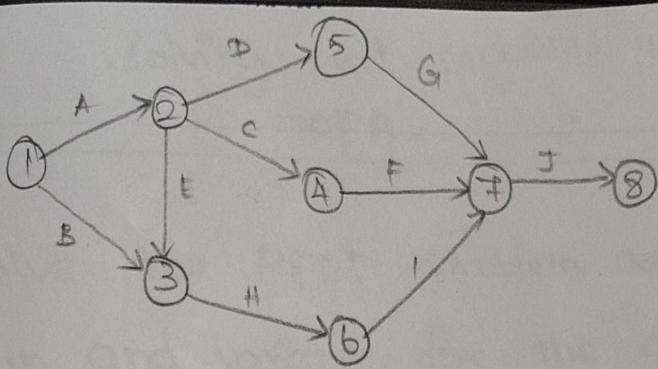
Aim:-

To find out the critical path for the given project using TORA.

Procedure:-

- 1) Start
- 2) Click on Start Button \rightarrow All programs \rightarrow TORA.
- 3) Go to main menu and select project planning and CPM - critical path method.
Enter the values of the network problem.

Activity	Description	Required Predecessor	Duration (year)
A	product design	(None)	1
B	Market research	(None)	1
C	Production analysis	A	2
D	Product model	A	3
E	Sales brochure	A	2
F	Cost analysis	C	3
G	product testing	D	4
H	Sales training	B, E	2
I	Pricing	H	1
J	project report	F, G, I	1



- 6) Now select SOLVE MENU and GO TO OUTPUT SCREEN. There are two options for output, Select CPM Calculations
- 7) For step-by-step calculation of earliest time and latest time using forward pass and backward pass procedure click NEXT STEP button. To get all the value instantly, then press ALL STEPS button.
- 8) The screen gives all the required values to analyse the problem. You may note that at the bottom of the table, the critical activities are highlighted in red colour.
- 9) Close the presentation
- 10) Stop.

Result:-

In the graph red coloured graph

Shows the critical path for the given problem.

Aim:-

To solve the PERT problem and find out the mean and variance for the different activity.

Procedure:-

- 1) Start
- 2) Click on Start Button \rightarrow All programs \rightarrow TORA.
- 3) Go to main menu and select project planning and PERT. Enter the values of the network problem such as activity starting and ending node and optimistic, most likely and pessimistic time.

	1-2	1-3	2-5	3-4	4-5	5-8	4-6	4-7
A	3	1	6	8	0	5	6	3
M	5	2	8	12	0	7	9	6
B	7	3	12	17	0	9	12	8

	6-9	8-9	7-10	9-10
A	1	3	8	2
M	2	5	15	5
B	3	8	20	6

- a) Now select solve MENU and GO TO OUTPUT SCREEN. There are two options for output, select PERT Calculation
- b) To calculate mean and variance select activity mean / var

- b) The screen gives all required values to analyse problem
- c) close the presentation
- d) Stop.

Result:-

Thus the mean and variance for the different activities & critical path has been calculated using TORA.

8
2

Queuing Model using TORA (M/M/1)

Aim :-

To find out the probability of customer in the system and also having LS, LQ, WS, WQ.

Sum :-

The arrival rate customer and banking customer follows poisson distribution with the mean of 45/hr ,the service rate of customer center clerk follows poisson distribution with the mean of 60/hr.

A. What is probability of having 0 customer in the system (P_0)?

B. What is the probability of having 5 customer in the system (P_5)?

C. What is probability of having 10 customer

D. Find the LS, LQ, WS, WQ.

LS - average number of customer in a server

LQ - average number of in query.

WS - average time customer spend in analysis.

WQ - average time customer in a query.

~~Procedure :-~~

- 1) Start \rightarrow all programs \rightarrow TORA.
- 2) Click \rightarrow click here \rightarrow queing analysis . Step.
- 3) Open a .box & click go to input screen
- 4) Types the problem title & no. of session
- 5) Press 'tab' key on key board \rightarrow then open

- b) Input table → enter the values.
- b) Click solve menu → save to your holder
- b) Click solve problem → go to output screen
option as decision.
- b) End program.

Result:-

The program was executed.

No: 25

Queuing Model using TORA (M/M/N)

Aim:-
To find out the probability of having
(N) number of customer in the system and
also to calculate Ls, Lq, Ws, Wq queuing
using TORA (M/M/N).

Procedure:-

- 1) Start \rightarrow all programs \rightarrow TORA.
- 2) Main menu will appear \rightarrow select the queuing analysis menu \rightarrow select input grid column \rightarrow click go to input screen.
- 3) Enter the program title and enter the no. of scansions then click to tab button.
- 4) Input table will appear & enter the lambda value and M value "enter the number" scansions.
- 5) Click solve menu save the data \rightarrow then click solve problem (modify input data).
- 6) Then go to output screen box will appear \rightarrow click go to screen.
- 7) Select output option \rightarrow select scenario then output will appear.
- 8) End of the program.

Result:-

The Queuing theory problem solved by TORA & executed successfully.

Network Model - Shortest Route.

Aim
to find out the shortest route between nodes for the given network diagram.

Procedure :-

- 1) Open TORA.
- 2) Main menu \rightarrow network models \rightarrow shortest route.
- 3) Go to input screen.
- 4) Enter the problem title \rightarrow solve menu \rightarrow solve problem \rightarrow shortest route.
- 5) Go to output screen \rightarrow click here to list all routes
- 6) Display the results.

Result:-

- The shortest route between nodes for the given network diagram is calculated.

Ex. No: 27 Network Model - Minimum Spanning Tree.

Aim:-

To find out the minimum spanning length for the given network diagram.

Procedure:-

- 1) Open TORA.
- 2) main menu \rightarrow networking model \rightarrow minimal spanning tree \rightarrow go to input screen
- 3) Enter the problem title \rightarrow enter the no. of node \rightarrow select tab.
- 4) Enter the node name \rightarrow column (or) row \rightarrow enter the node values and column values (or) row values.
- 5) Select solve menu \rightarrow select save \rightarrow solve the problem \rightarrow go to output screen
- 6) click all iterations \rightarrow select ok \rightarrow display the result.

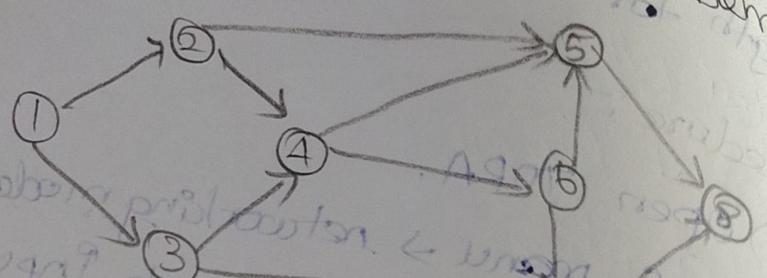
Result:-

The minimum spanning length for the given network diagram is running successfully.

Ex. No: 28
Network Model

Maximum flow

Problem: maximum off two brg. or
maximum flow Problem



2nd. extra & 1st. making off extra (e
edge 4-6) & dot back & when 70. on
arrow (6) number can not off extra (e
arrow back number can not off extra
number over (6) number
number over 100. & when when 70. on
number twice & 10 & making off
& do 100. & writing off 100. 100. (e
thus off back

1st. extra problem maximum off
& maximum flow problem

Network Model -

Maximum Flow.

Aim:

to

find out the maximum flow between
nodes for the given network diagram.

Procedure:

Open TORA

2) Main menu \rightarrow network models \rightarrow maximum flow.

3) Go to input screen \rightarrow enter the problem
title & no. of nodes \rightarrow click on tab of

4) Enter the all nodes values for node 1 to
node 8 \rightarrow solve menu \rightarrow save.

5) Solve problem \rightarrow go to output screen \rightarrow
select output for maximum flows.

6) See the results.

maximum flow

8 0 2 11 8 2 1 program

8.0 8.0 8.0 8.0 8.0 8.0 8.0

Result:-

The maximum flow from the

node 1 to node 8 is find out

successfully.

Portfolio Management Using Excel.

Problem:-

Eby Abraham has recently inherited some money which he would like to invest in stock. Eby already holds stock in Company A, and over the past ten years he has received an average annual return of 7.48% on his investment. He would like to increase this and hence informed his investment banker that an annual return of at least 12% is his desired objective. The bank's funds investment C, whose stock performances meet Eby's requirements?

Company	1	2	3	4	5	6	7	8	9	10
A	8.5	15.3	11.5	-1.6	-3.6	8.4	6.8	11.9	6.1	11.5
B	6.7	9.2	11.3	17.7	7.4	18	11.5	15.1	19.4	15.2
C	15.1	27.8	38.6	-12	5.6	12.7	-2.1	12.8	36.8	22

Portfolio Management using Excel.

Aim

To identify the better portfolio for the investment using Excel.

Procedure:-

i) Start \rightarrow all programs \rightarrow MS office \rightarrow MS Excel.

Enter the data given in table.

To find the average return received from each portfolio by clicking \rightarrow formulae \rightarrow insert function \rightarrow choose AVERAGE function and select the reference. ($=AVERAGE(E7:N7)$)

To find the standard deviation received from each portfolio by clicking \rightarrow formulae \rightarrow insert function \rightarrow choose STDEV function and select the reference. ($=STDEV(E7:N7)$)

Choose the portfolio which has more average return and less standard deviation.

Result :-

Portfolio analysis for the given data performed successfully.