SPSS CODING WITH PROBLEM

SPSS Coding with Problems

Problem1: Suppose we want to Compute the "Increment" and "Present Salary" of the employee from the following data,

<u>**Salary**</u>

10000 13000 15500
15000 14000 16500
12000 17000 17500

- Increment = (10% of the salary)+1000
- Present Salary=Salary+Increment

Command: 1.
```
SAVE OUTFILE='C:\Users\ASUS\Documents\Mahdi Solve
1.sav'
  /COMPRESSED.
```

COMPUTE Increnebt=Salary * 0.10 + 1000.
EXECUTE.

Command: 2.
COMPUTE Present_Salary=Salary + Increnebt.
EXECUTE.

Problem 2: Suppose we want to find the deduction from the salary for the transport facility for the employees of a firm from the following data of salary. It is given that 5% of salary is deducted if salary is Gretter then 12000 taka.

Command :
IF (Salary > 12000) Deduct=Salary * 0.05.
EXECUTE.

Problem : 3. Suppose we want to Complete the Increment of the employee who at satisfies the following condition from the following data.
Condition: Increment= 15% of the salary if job category =3 and Experience is Gretter then or equal to 5 years.

Salary	Job category	Experience (Year)
10000	1	5
15000	2	6
17000	3	7
21000	3	8
18000	3	5

Command:
IF(Job_Cat = 3 & Experience >= 5) Increment=Salary * 0.15.
EXECUTE.

Problem 4: Recode Into Different Variable

Suppose we want to create "Social-Status" on the basis of Income Variable.

Income

10000 13000 15500
15000 14000 16500
12000 17000 17500

Income	New Value
Less or equal 10000	1
10001-12000	2
12001-15000	3
15001-17000	4
17001-17500	5

Command:
```
RECODE Salary (Lowest thru 10000=1) (10001 thru
12000=2) (12001 thru 15000=3) (15001 thru 17000=4)
(17001 thru 17500=5) INTO Social_Status.
EXECUTE.
```

Problem 5: Suppose we want to define "Educational Status" On the basis of "Year of Schooling" from the following data.

Year of Schooling	New Value	Value Label
0	1	Illiterate
1-5	2	Primary
6-10	3	Secondary
11-12	4	Higher Secondary
13-16	5	Graduate
17	6	Post Graduate
18	7	Higher

Year of Schooling

15, 07, 14, 08, 18, 00, 18, 06, 17, 11, 10, 05, 12, 16.

Construct a Frequency Distribution Table Using Educational Status Variable.

Command:
```
RECODE Year_Of_SChooling (17=6) (18=7) (Lowest thru
0=1) (1 thru 5=2) (6 thru 10=3) (11 thru 12=4) (13
thru 16=5) INTO Educational_Status.
EXECUTE.

FREQUENCIES VARIABLES=Educational_Status
  /ORDER=ANALYSIS.
```

Table For Frequency

Educational_Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	illeterate	1	11.1	11.1	11.1

	Secondary	3	33.3	33.3	44.4
	Graduate	2	22.2	22.2	66.7
	Post Graduate	1	11.1	11.1	77.8
	Higher	2	22.2	22.2	100.0
	Total	9	100.0	100.0	

Command For Graph
For Pie Chart:

```
GRAPH
  /PIE=PCT BY Educational_Status.
```

For Bar Chart
```
GRAPH
  /BAR(GROUPED)=PCT BY Age BY Educational_Status.
```

Problem 6: Consider the following Table

ID	Gender	Age	Diabeties	Smoking Status
1	Male	65	Yes	Yes
2	Female	18	No	No
3	Female	46	Yes	Yes
4	Male	57	Yes	yes
5	male	26	no	no
6	male	45	yes	yes
7	female	29	no	yes
8	male	68	yes	no
9	male	39	no	yes
10	female	41	No	no

- **Construct a Simple Bar Diagram for "Diabetes"**
- **Construct a Clustered Bar Diagram for "Diabetes" and "Smoking Status"**
- **Draw a Stacked bar Diagram for "Diabetes" and "gender"**
- **Perform a bivariate Analysis for "Gender" and "Diabetes"**

Command1:

```
GRAPH
  /BAR(SIMPLE)=PCT BY Diabeties.
```
Command2:

```
GRAPH
  /BAR(GROUPED)=PCT BY Diabeties BY Smoking_Status.
```
Command3:

```
GRAPH
  /BAR(STACK)=PCT BY Diabeties BY Gender.
```
Command4:
```
CROSSTABS
  /TABLES=Gender BY Diabeties
  /FORMAT=AVALUE TABLES
  /STATISTICS=CHISQ
  /CELLS=COUNT TOTAL
  /COUNT ROUND CELL.
```
Table For Crosstabs & Chi Square Test

Gender of The Respondent * Diabeties Status Of The Respondent Crosstabulation

			Diabeties Status Of The Respondent		Total
			Yes	No	
Gender of The Respondent	Male	Count	4	2	6
		% of Total	40.0%	20.0%	60.0%
	Female	Count	1	3	4
		% of Total	10.0%	30.0%	40.0%
Total		Count	5	5	10
		% of Total	50.0%	50.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.667[a]	1	.197		
Continuity Correction[b]	.417	1	.519		
Likelihood Ratio	1.726	1	.189		
Fisher's Exact Test				.524	.262
Linear-by-Linear Association	1.500	1	.221		
N of Valid Cases	10				

a. 4 cells (100.0%) have expected count less than 5. The minimum expected count is 2.00.

b. Computed only for a 2x2 table

Problem 7: Suppose we want to define the "Social Status" on the basis of "Income" Variable using the following data.

Income	New value	Meaning
0-3000	1	Lower Class
3001-10000	2	Lower Middle Class
10001-25000	3	Middle Class
25001-100000	4	Higher Middle Class
100000 above	5	Higher Class

Income

20000, 3200, 900, 45000, 1800, 11000, 7000, 245000, 35000, 48000, 32000, 56000, 22000, 125000

- **Construct a frequency Distribution Table for "Social Status"**
- **Draw a pie Chart and Bar Diagram for the Appropriate Variable from the above data.**

Command1:

```
FREQUENCIES VARIABLES=Income
  /FORMAT=NOTABLE
  /STATISTICS=STDDEV VARIANCE RANGE MINIMUM MAXIMUM
SEMEAN MEAN MEDIAN MODE SUM SKEWNESS SESKEW KURTOSIS
SEKURT
  /ORDER=ANALYSIS.
```

Command2:

For Bar Chart:
```
GRAPH
  /BAR(SIMPLE)=PCT BY Social_Status.
```
For Pie Chart:
```
GRAPH
  /PIE=PCT BY Social_Status.
```
Problem8: Let us consider the following data.

Sales Experience (In Year) X	Annual Sales Y
1	80
3	97
4	92
4	102
6	103
7	98
8	419
10	123
11	110
13	125

- Draw a Scatter Diagram and Interpret Your result.
- Perform Correlation Analysis and Interpret your Result. Also test whether there is any Correlation between X and Y

Command1:
```
GRAPH
  /SCATTERPLOT(BIVAR)=X WITH Y
  /MISSING=LISTWISE.
```

Interpretation: From the Scatter diagram, it can be concluded that X and Y are positively related. That means, as X Increase, Y also increase.

Command2:
```
CORRELATIONS
```

```
    /VARIABLES=X Y
    /PRINT=TWOTAIL NOSIG
    /MISSING=PAIRWISE.
```
Table for Correlation

Correlations

		Sales Experience (in Year)	Annual Sales
Sales Experience (in Year)	Pearson Correlation	1	.239
	Sig. (2-tailed)		.506
	N	10	10
Annual Sales	Pearson Correlation	.239	1
	Sig. (2-tailed)	.506	
	N	10	10

Interpretation: The value of Correlation Coefficient $r = 0.239$ Which Implies that There is a weak positive Association between X and Y

Hypothesis to be tested

$H_0 : \rho = 0$; There is no association between X and Y

$H_1 : \rho \neq 0$; There is association between X and Y

Comment: P Value $= 0.506$, since P value is Greeter Then 0.05. So we may accept our null Hypothesis at 5% Level of Significance and concluded that the correlation coefficient is equal to zero , There is no linear association between X and Y.

Problem 9: Calculate the Correlation Coefficient and Comment on your Result.

Price (tk)	Supply(Kg)
10	30
12	33
18	45
16	44
15	42
19	48
18	47
17	46
19	30
16	35

14	45
10	44
9	30

Command:
CORRELATIONS
  /VARIABLES=X Y
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.

Table for Correlation

Correlations

		Price	Suplly
Price	Pearson Correlation	1	.477
	Sig. (2-tailed)		.100
	N	13	13
Suplly	Pearson Correlation	.477	1
	Sig. (2-tailed)	.100	
	N	13	13

Interpretation: Correlation Coefficient $r = 0.477$ which implies that there is a moderate positive Correlation Between Price and supply. So the Hypothesis is to be tested

I.e. $H_0: \rho = 0$; there is no association between Price and supply

$H_1: \rho \neq 0$; There is association between Price and supply.

Comment: P value $= 0.100$ is Gretter then 0.05 then we accept our null Hypothesis with 5% level of Significance.

So that, there is no association between Pruce and Supply. There is no linear association between Price and Supply.

Problem 10:

Y Sales	X_1 (Experience)	X_2(Age)	X_3(Education)	X_4(Gender)	X_5(Region)
15	2	30	10	Male	Dhak
24	4	45	12	Female	Raj
12	1	22	10	Male	Khul
16	3	25	13	Male	Dhak
18	6	30	14	Female	Khul
17	2	31	15	Female	Dhak
19	5	38	10	Male	Raj
16	3	24	12	Female	Dhak
13	2	19	13	Male	Dhak
15	3	45	15	Male	Raj

- Fit a Regression Line of Y on $X_1, X_2, \ldots \ldots X_5$ also Interpret your Result.
- Test Whether the covariates have significant impact on Y or not Comment on your Result.

Command:
```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Y
  /METHOD=ENTER X1 X2 X3 X4 Dhak.
```

Table for Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.922[a]	.850	.663	1.959

a. Predictors: (Constant), Dhak, Gender, Education, Experience, Age

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	87.152	5	17.430	4.543	.084[b]
1	Residual	15.348	4	3.837		
	Total	102.500	9			

a. Dependent Variable: Sales

b. Predictors: (Constant), Dhak, Gender, Education, Experience, Age

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	8.213	4.713		1.743	.156
	Experience	.796	.548	.359	1.453	.220
1	Age	.243	.094	.659	2.587	.061
	Education	-.541	.375	-.313	-1.443	.223
	Gender	3.006	1.472	.460	2.042	.111
	Dhak	1.610	1.705	.251	.944	.399

a. Dependent Variable: Sales

Interpret & Regression Coefficient

Here the Regression equation is $Y = 8.213 + 0.796X_1 + 0.243X_2 - 0.541X_3 + 3.006X_4 + 1.610X_5$

$\alpha = 8.213$ When all the independent variables are Equal to Zero Then the average value of Y is 8.213.

$\hat{\beta}_{Exp} = 0.796$ For 1 Unit increase in X_1, then the average value of Y increase 0.796

$\hat{\beta}_{Age} = 0.243$ For 1 Unit Increase in X_1 it increase the average value of Y is 0.243

$\hat{\beta}_{Edu} = -0.541$ For 1 Unit Increase in X_1 it Decrease the average value of Y is 0.541

$\hat{\beta}_{Gender} = 3.006$ On the average male Individual Sales 3.006 Higher Compared to Female Individuals.

$\hat{\beta}_{Dhak} = 1.610$ On the average region Individual sales 1.610 Higher compared to Khulna.

Hypothesis:
$$H_{01}: \beta_{Exp} = 0$$
$$H_{11}: \beta_{Exp} \neq 0$$
Comment: Hence The P Value is 0.220 is Gretter Then 0.05 then we accept H_0 at 5% level of Significance. So that X_1 has no significant Impact on Y

Problem 12: Consider the following data:

Gender	No of House Worked
Male	40
Female	38
Female	60
Male	44
Male	40
Female	55
Female	42
Male	50
Female	60
Male	50
Female	40
Male	45
Female	50
Female	48
Male	40
Female	50
Female	50
Male	40
Male	40
Male	60

- Test Whether the Student work 40 Hours work in average or not.
- Weather the male and Female work the same average number of hours or not.

Command 1:

```
T-TEST
  /TESTVAL=40
  /MISSING=ANALYSIS
  /VARIABLES=House_Worked
  /CRITERIA=CI(.95).
```

Interpret: Hence the Hypohesis is

$$H_{01}: \mu = 40$$
$$H_{11}: \mu \neq 40$$

There the P Value Is 0.000 is less then 0.05 so the null Hypothesis is rejected at 5% level of significant. So the Students worked not 40 Average.

Table for T Test

One-Sample Test

	Test Value = 40					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
No of House Worked	4.313	19	.000	7.100	3.65	10.55

Command 2:

```
T-TEST GROUPS=Gender(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=House_Worked
  /CRITERIA=CI(.95).
```
Table for Groups T Test

Interpret: Hypothesis:

$$\mathbf{H_{01}: \mu_1 = \mu_2}$$
$$\mathbf{H_{01}: \mu_1 \neq \mu_2}$$

Here μ_1 = Average Hour Worked Student by the male Students
And μ_2 = Average Hour Worked Student by the female Students

Comment: Here the P Value = 0.189 is Gretter Then 0.05 so that we accept our Null Hypothesis at 5% level of significance. So that males and females work the same average number of hours.

Design of Experiments

Problem 13: Consider the following data;

Fertilizer 1	Fertilizer 2	Fertilizer 3
77	72	76
81	58	85
71	74	82
76	60	80
80	70	77

Perform ANNOVA and test null hypothesis concerning Fertilizers at 5% level of Significant Interpret your Result.

Command:

```
ONEWAY Production BY Fertilizers
  /MISSING ANALYSIS.
```

Interpret: Hypothesis: $H_0: \mu_1 = \mu_2 = \mu_3$
$\qquad\qquad H_1: \mu_1 \neq \mu_2 \neq \mu_3$/ at least two are not equal.
Here μ_1 is average Production Under Fertilizer 1
μ_2 Average Production Under Fertilizer 2
μ_3 Average Production under Fertilizer 3
Table for One way Classification

ANOVA

Production of the land

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	478.800	2	239.400	8.737	.005
Within Groups	328.800	12	27.400		
Total	807.600	14			

Comment: Hence The P Value Is 0.005 is Less then the 0.05 so we reject our null hypothesis at 5% level of significance that means average production significantly differs under Fertilizers.
Since H_0 is Rejected that's why we have to perform LSD for pairwise comparison.
Here $H_{01}: \mu_1 = \mu_2$
$H_{11}: \mu_1 \neq \mu_2$
Command For LSD:
```
ONEWAY Production BY Fertilizers
  /PLOT MEANS
  /MISSING ANALYSIS
  /POSTHOC=LSD ALPHA(0.05).
```

Comment: Here From the table we find that the P Value is 0.010 is less then 0.05 so we reject our null hypothesis. That means Average yield under Fertilizers 1 & 2 Significantly Differs.

Hypothesis: $H_{02}: \mu_2 = \mu_3$

$\qquad\quad H_{12}: \mu_2 \neq \mu_3$

Table for LSD

Multiple Comparisons

Dependent Variable: Production of the land

LSD

(I) Fertilizer Of the land	(J) Fertilizer Of the land	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	10.200*	3.311	.010	2.99	17.41
	3	-3.000	3.311	.383	-10.21	4.21
2	1	-10.200*	3.311	.010	-17.41	-2.99
	3	-13.200*	3.311	.002	-20.41	-5.99
3	1	3.000	3.311	.383	-4.21	10.21
	2	13.200*	3.311	.002	5.99	20.41

*. The mean difference is significant at the 0.05 level.

Comment: Here From the table we find the P Value is 0.002 is less then 0.05 So we accept our Null Hypothesis at 5% level of significance. That means average yield of fertilizer 2 & 3 significantly differs.

Hypothesis: $H_{03}: \mu_1 = \mu_3$

$\qquad\quad H_{13}: \mu_1 \neq \mu_3$

Comment: Here we find that P Value is 0.383 is Gretter then 0.05 Then we Accept our null Hypothesis at 5% level of significance. That means average yield of fertilizer 1 & 3 not significantly Differs.

Problem 14: Consider the following data.

Treatment	A	B	C	D	E	F
	39	26	35	26	24	28
	45	43	28	27	28	36
	28	32	36	30	31	45
Yield	32	40	24	25	29	41
	38	29	31	42	44	25

Perform ANNOVA and test the significance of difference between treatment means at 5% Level of significance. Also interpret your result.

Command:

```
ONEWAY Producton BY Fertilizers
  /PLOT MEANS
```

```
/MISSING ANALYSIS
/POSTHOC=LSD ALPHA(0.05).
```

Hypothesis: $H_0: \mu_1 = \mu_2 = \mu_3$
$H_1: \mu_1 \neq \mu_2 \neq \mu_3$/at least two are not equal

ANNOVA Table For One Way Classification

ANOVA

Production

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	167.900	5	33.580	.676	.646
Within Groups	1192.800	24	49.700		
Total	1360.700	29			

Comment: Hence the P value is 0.646 is Gretter Then 0.05 so the null hypothesis is accepted at 5% level of significance. That means average yield of Fertilizer A B C D E and F are not significantly Differs.

Problem 15: The Following data relate a RBD with 4 Treatments in 3 Blocks.

Treatment		1	2	3	4
	1	22	26	25	25
Blocks	2	25	27	28	26
	3	26	29	38	20

Perform ANNOVA & test the null hypothesis concerning Block & treatment at 5% level of significance Interpret your result.

Command (for Block):

```
UNIANOVA Yield BY Block
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /POSTHOC=Block(LSD)
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Block.
```

Hypothesis: Hypothesis to be tested For Block $H_{01}: \mu_{B_1} = \mu_{B_2} = \mu_{B_3}$
H_{11}: at least two are not equal

Here μ_{β_1} = Mean Production Under Block 1
μ_{β_2} = Mean Production Under Block 2
μ_{β_3} = Mean Production Under Block 3

Table (For Block)

Tests of Between-Subjects Effects

Dependent Variable: Yield

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	106.167[a]	2	53.083	4.324	.048
Intercept	9185.333	1	9185.333	748.127	.000
Block	106.167	2	53.083	4.324	.048
Error	110.500	9	12.278		
Total	9402.000	12			
Corrected Total	216.667	11			

a. R Squared = .490 (Adjusted R Squared = .377)

Comment: From the table we have the P value is 0.048 is Less then 0.05 so the null hypothesis is rejected at 5% level of significant. That means there is significant difference among the Blocks.

Command for Treatments:

```
UNIANOVA Yield BY Treatment
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /POSTHOC=Treatment(LSD)
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Treatment.
```

Table (For Treatment)

Tests of Between-Subjects Effects

Dependent Variable: Yield

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	58.000[a]	3	19.333	.975	.451
Intercept	9185.333	1	9185.333	463.126	.000
Treatment	58.000	3	19.333	.975	.451
Error	158.667	8	19.833		
Total	9402.000	12			
Corrected Total	216.667	11			

a. R Squared = .268 (Adjusted R Squared = -.007)

Comment: Here P Value is 0.451 is Gretter then 0.05 so we accept our null Hypothesis at 5% Level of Significance. So we write that there is no significant difference among the treatment.

Advanced Statistical Analysis In SPSS For Windows

Problem 1: From SPSS Data "**Employee data.sav**" Analyze Correlation Analysis between Salary and Salary begin also interpret your Result

Coding:

```
CORRELATIONS
  /VARIABLES=salary salbegin
  /PRINT=TWOTAIL NOSIG
  /STATISTICS DESCRIPTIVES
  /MISSING=PAIRWISE.
```

Table:

Descriptive Statistics

	Mean	Std. Deviation	N
Current Salary	$34,419.57	$17,075.661	474
Beginning Salary	$17,016.09	$7,870.638	474

Correlations

		Current Salary	Beginning Salary
Current Salary	Pearson Correlation	1	.880**
	Sig. (2-tailed)		.000
	N	474	474
Beginning Salary	Pearson Correlation	.880**	1
	Sig. (2-tailed)	.000	
	N	474	474

**. Correlation is significant at the 0.01 level (2-tailed).

Interpretation: According to this result we can mention that the **Coefficient of correlation $r = 0.880$** which is **highly positively correlated which is 1%** **level of significance.**

Problem 2: Fit a multiple regression to the data and test the significance of the regression equation.

Yield (t/ha): y	Tillers (no/hill):x_1	Plant Height (Cm): x_2
5.5	13.6	110.7
5.7	13.9	109.8
5.9	14.6	106.5
6.3	15.2	105.9
6.5	15.7	104.8
6.5	16.2	106.9
6.7	17.3	95.7
7.2	17.8	93.4
7.3	18.2	84.6
7.5	18.5	80.4
7.8	19	78.6
7.9	19.2	76.6

Coding:

```
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT y
  /METHOD=ENTER x1 x2
  /SCATTERPLOT=(y ,*ZPRED)
  /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID).
```

Table:

Correlations

		y	x1	x2
Pearson Correlation	y	1.000	.988	-.955
	x1	.988	1.000	-.950
	x2	-.955	-.950	1.000
Sig. (1-tailed)	y	.	.000	.000
	x1	.000	.	.000
	x2	.000	.000	.
N	y	12	12	12
	x1	12	12	12
	x2	12	12	12

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	2.178	1.943		1.121	.291	-2.216	6.573			
	x1	.335	.063	.827	5.339	.000	.193	.477	.988	.872	.259
	x2	-.011	.010	-.169	-1.094	.302	-.032	.011	-.955	-.343	-.053

a. Dependent Variable: y

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.054	2	3.527	207.807	.000[b]
	Residual	.153	9	.017		
	Total	7.207	11			

a. Dependent Variable: y

b. Predictors: (Constant), x2, x1

Interpretation: From the above outputs, we have

$$a = Constant = 2.178$$
$$b_1 = Partial\ Regression\ Coefficient\ of\ x_1 = 0.335$$
$$b_2 = Partial\ Regression\ coefficient\ of\ x_2 = -0011$$

Hence estimated regression equation is $y = 2.178 + 0.335x_1 - 0.011x_2$ and the effect of x_1 on y is highly significant at 1% level of significant.

Again, The calculated value of $R^2 = 0.979$ and calculated value of F= 207.80 so, F Ratio is highly significant.

Therefore, the combined effect of tiller number and plant height on yield is highly significant.

Since $R^2 = 0.979$ i.e. 97.9% variation of the yield is explained by tiller number and plant height.