PROBLEM 2

Data Set had to be prepared before use.

This is the Metadata

The CONTENTS Procedure

Data Set Name	WORK.JOBSBY_EDU_GENDER_A3	**Observations**	80
Member Type	DATA	**Variables**	3
Engine	V9	**Indexes**	0
Created	03/06/2021 21:11:13	**Observation Length**	16
Last Modified	03/06/2021 21:11:13	**Deleted Observations**	0
Protection		**Compressed**	NO
Data Set Type		**Sorted**	NO
Label			
Data Representation	SOLARIS_X86_64, LINUX_X86_64, ALPHA_TRU64, LINUX_IA64		
Encoding	utf-8 Unicode (UTF-8)		

Engine/Host Dependent Information	
Data Set Page Size	131072
Number of Data Set Pages	1
First Data Page	1
Max Obs per Page	8126
Obs in First Data Page	80
Number of Data Set Repairs	0
Filename	/saswork/SAS_work2C6000000B05_odaws01-usw2.oda.sas.com/SAS_workC86300000B05_odaws01-usw2.oda.sas.com/jobsby_edu_gender_a3.sas7bdat
Release Created	9.0401M6
Host Created	Linux
Inode Number	536988913
Access Permission	rw-r--r--
Owner Name	u54770142
File Size	256KB
File Size (bytes)	262144

Alphabetic List of Variables and Attributes

#	Variable	Type	Len	Format	Informat	Label
3	Education	Char	2	$2.	$2.	Education
2	Gender	Char	6	$6.	$6.	Gender
1	Jobs	Num	8	BEST.		Jobs

*Problem 2 [10 marks]
One measure of the health of a national economy is how quickly it creates jobs. One aspect of this issue is the number of jobs individual hold. As part of a study on job tenure, a survey was conducted wherein Americans aged between 17 and 45 were asked how many jobs they have held in their lifetimes. Also recorded were gender and educational attainment.
The categories are:
Less than high school (E1)
High school (E2)
Some college/university but not degree (E3)
At least one university (E4)

File: Comparing the Lifetime Number of Jobs by Educational Level (Organize Data by Gender and Education)

A. Test to determine whether there is interaction between gender and education in holding jobs.
B. Test to determine whether there are differences in holding jobs between men and women.
C. Test to determine whether there are differences in holding jobs between the educational levels.;

```
ods graphics on;
Title "Two-way Anova Analysis to determine whether job tenure varies by Education Level and Gender";
Proc glm data=WORK.JOBSBY_EDU_GENDER_A3;
 Class Education Gender;                    *TWO FACTORS or independent variables
 Model Jobs = Education Gender Education*Gender /ss3;
 Lsmeans Education*Gender / slice=Education;
Run;
Quit;
Ods graphics off;
```

I am working with the following hypothesis:

H0: The means of jobs(numbers of jobs) for all Education Level Groups are equal
Ha: The means of jobs(numbers of jobs) for all Education Level Groups are different

H0: The means of jobs(numbers of jobs) for the 2 Genders are equal
Ha: The means of jobs(numbers of jobs) for the 2 genders are different

H0: There is no interaction between Education Level and Gender
Ha: There is interaction between Education Level and Gender

Two-way Anova Analysis to determine whether job tenure varies by Education Level and Gender

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Education	4	E1 E2 E3 E4
Gender	2	Female Male

Number of Observations Read	80
Number of Observations Used	80

Education levels are describer in the header of the problem. Previous page

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Two-way Anova Analysis to determine whether job tenure varies by Education Level and Gender

The GLM Procedure

Dependent Variable: Jobs Jobs

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	153.3500000	21.9071429	2.17	0.0467
Error	72	726.2000000	10.0861111		
Corrected Total	79	879.5500000			

R-Square	Coeff Var	Root MSE	Jobs Mean
0.174351	30.46392	3.175864	10.42500

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Education	3	135.8500000	45.2833333	4.49	0.0060
Gender	1	11.2500000	11.2500000	1.12	0.2944
Education*Gender	3	6.2500000	2.0833333	0.21	0.8915

H0: The means of jobs(numbers of jobs) for all Education Level Groups are equal
Ha: The means of jobs(numbers of jobs) for all Education Level Groups are different

Conclusion: Since P value is less than 0.05, there is a significant variation in jobs in the samples taken (various Education grousps and 2 Genders)

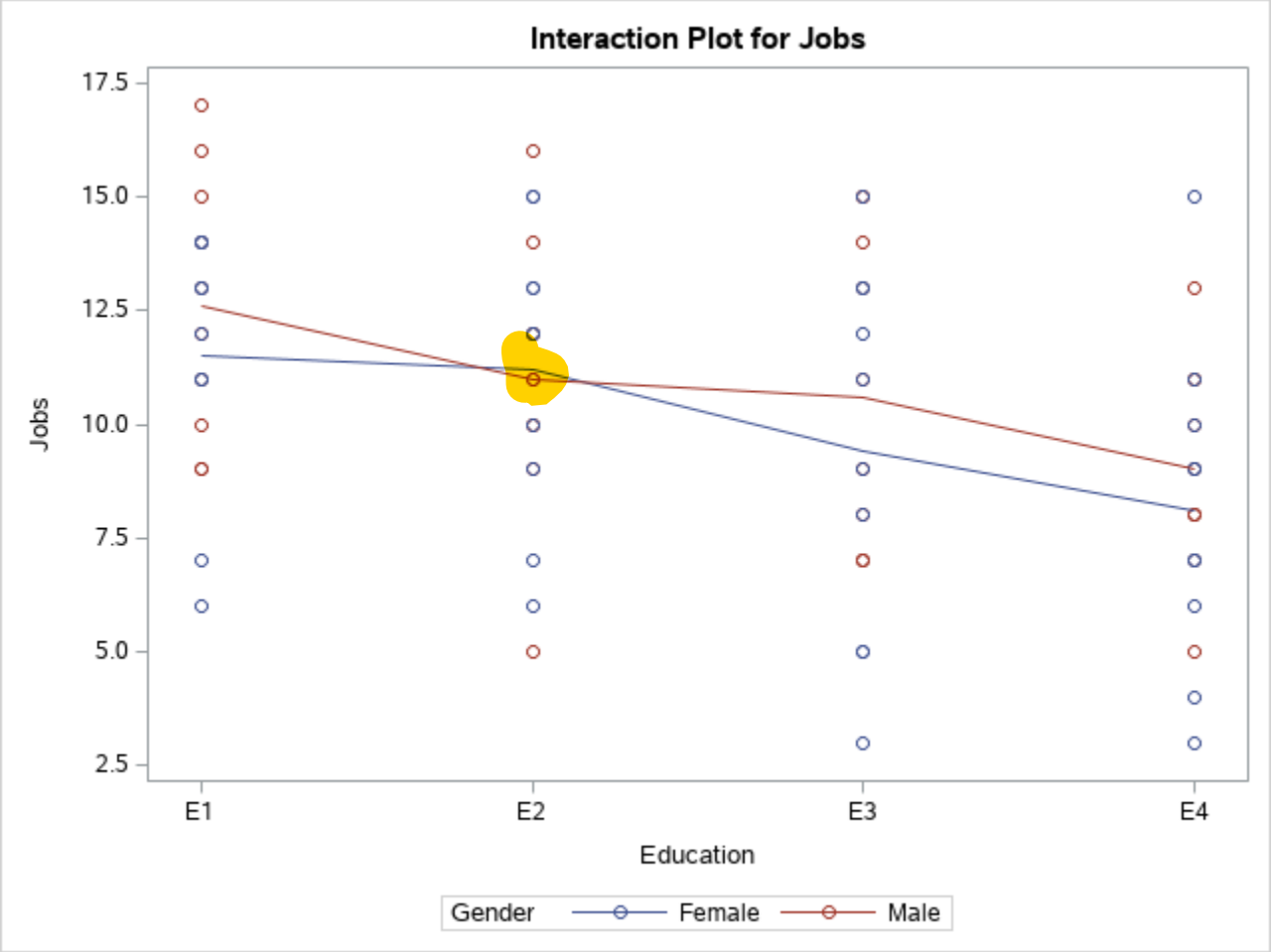
H0: The means of jobs(numbers of jobs) for the 2 Genders are equal
Ha: The means of jobs(numbers of jobs) for the 2 genders are different
Conclusion: Because P value is greater than 0.05, we conclude that there is not variation in the number of jobs held by the 2 groups of gender.

H0: The means of jobs(numbers of jobs) for the 4 Education Levels are equal

Ha: The means of jobs(numbers of jobs) for the 4 Education Levels are different

Conclusion: Because P value is less than 0.05, we conclude that there is significant variation of jobs held by Education Level Groups

H0: There is no interaction between Education Level and Gender
Ha: There is interaction between Education Level and Gender
Conclusion: The interaction of Gender and Education Level is not significant (P value is more than 0.05). Thus we fail to reject the null hypothesis that states that there is no interaction

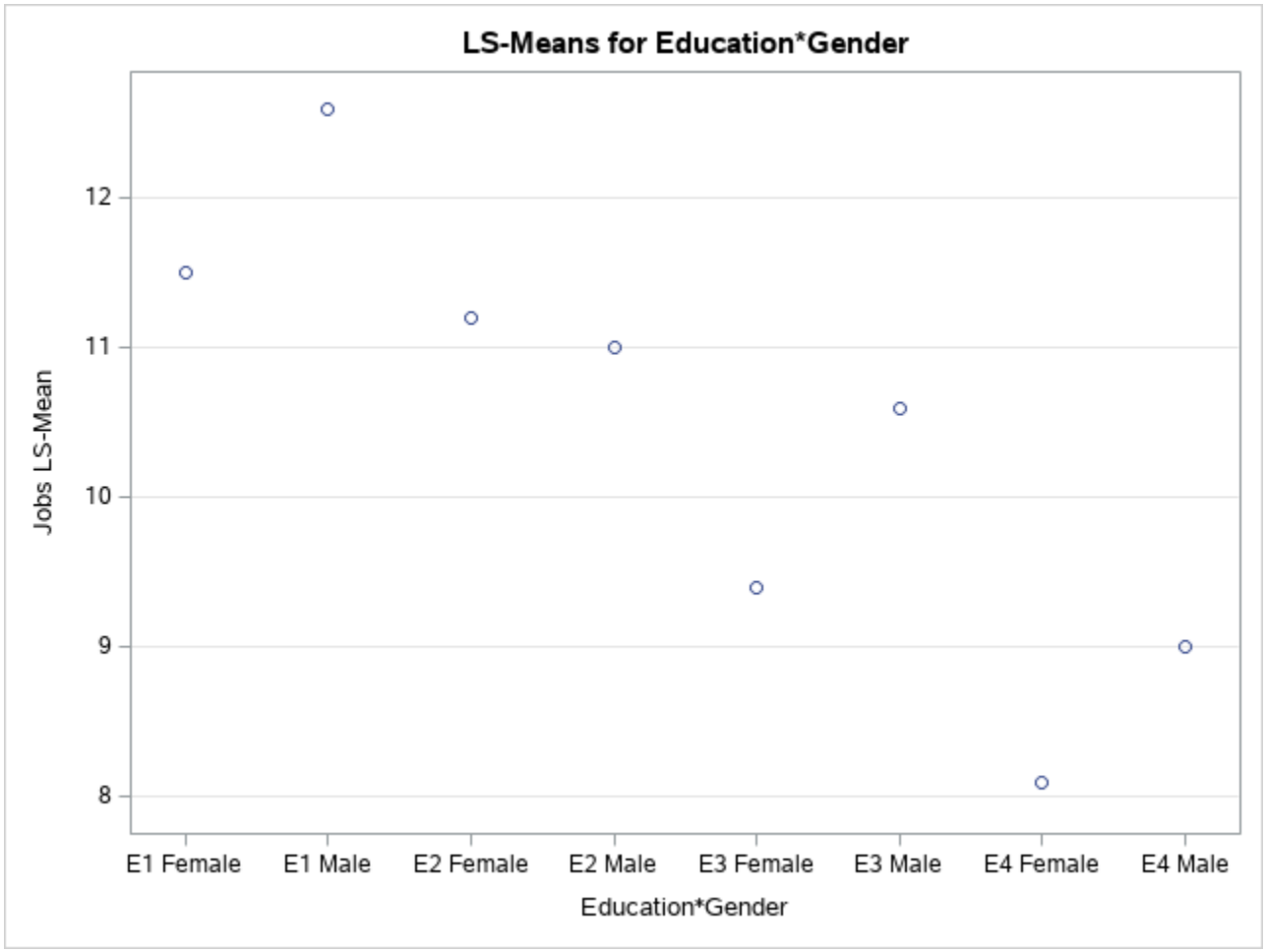


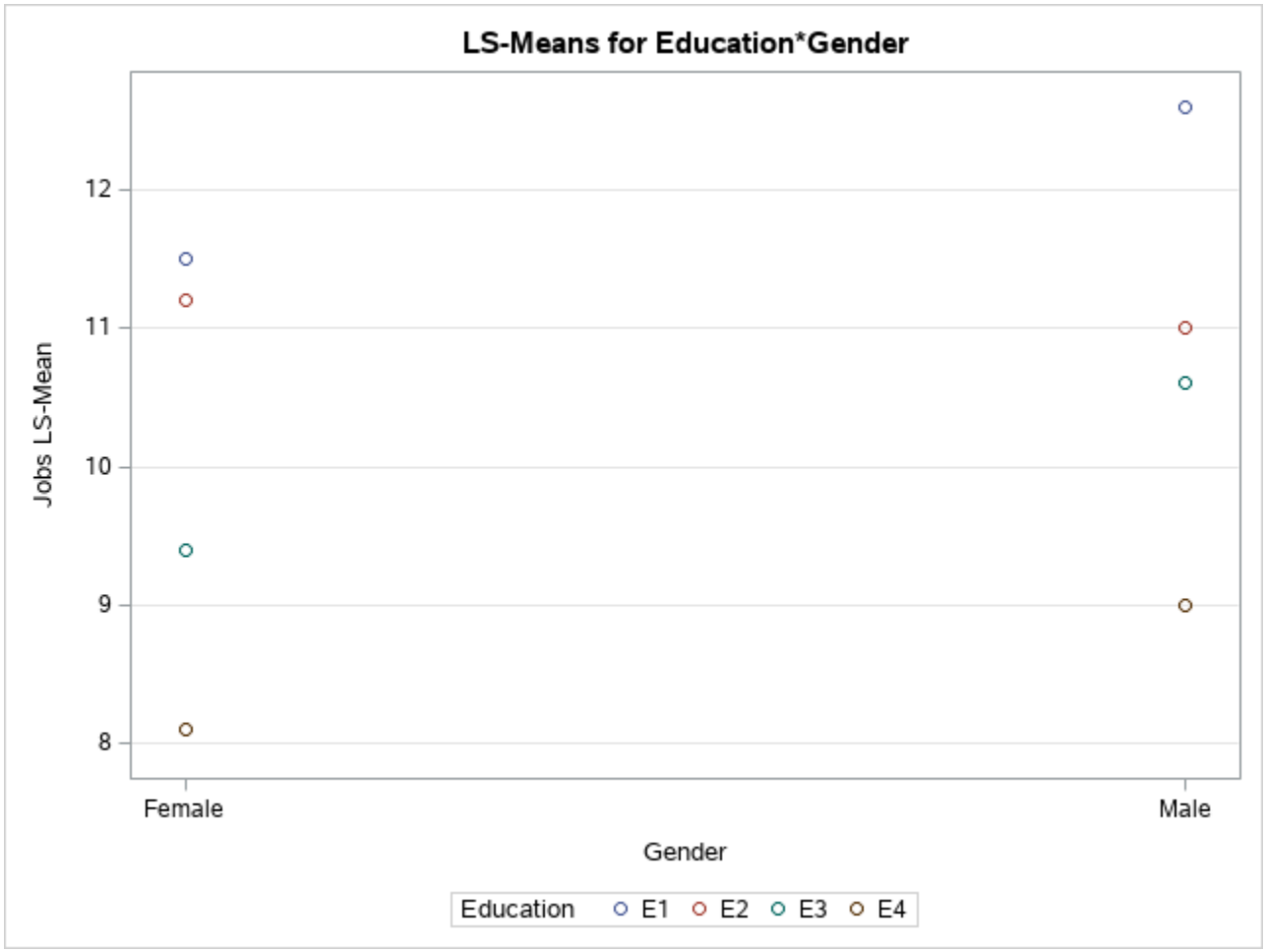
Two-way Anova Analysis to determine whether job tenure varies by Education Level and Gender

The GLM Procedure
Least Squares Means

Education	Gender	Jobs LSMEAN
E1	Female	11.5000000
E1	Male	12.6000000
E2	Female	11.2000000
E2	Male	11.0000000
E3	Female	9.4000000
E3	Male	10.6000000
E4	Female	8.1000000
E4	Male	9.0000000

We can see in the Interaction plot that Education and Gender are not parallel as they intertwine at E2. Because the results of interaction are not clear. Let's take a look at the LS Means Matrix and the following plots


LS-Means for Education*Gender
Jobs LS-Mean
12
11
10
9
8
E1 Female
E1 Male
E2 Female
E2 Male
E3 Female
E3 Male
E4 Female
E4 Male
Education*Gender


LS-Means for Education*Gender
Jobs LS-Mean
12
11
10
9
8
Female
Male
Gender
Education
E1
E2
E3
E4

The GLM Procedure
Least Squares Means

Education*Gender Effect Sliced by Education for Jobs					
Education	**DF**	**Sum of Squares**	**Mean Square**	**F Value**	**Pr > F**
E1	1	6.050000	6.050000	0.60	0.4412
E2	1	0.200000	0.200000	0.02	0.8884
E3	1	7.200000	7.200000	0.71	0.4010
E4	1	4.050000	4.050000	0.40	0.5283

From the above 2 plots, there is not associated pattern between Means and Means by Educational Level

From the LSMeans Matrix, we can see the none of the P values are less than 0.05 for the 4 Education Levels, thus we conclude that there is no interaction between Education Level and Gender

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