Practice Exam : computer application **A** **2nd stage of Chemistry dep.**
Name:

An investigator is interested in the effects of vitamin B on memory function. He randomly assigns each of 13 participants to one of 3 groups. Answer the following questions:

Gender	vitamin B	Memory function
0	Bcom	23.550
1	B6	19.250
1	Bcom	17.650
0	B12	20.050
0	Bcom	25.500
1	B6	16.350
1	B6	17.650
1	Bcom	25.500
1	B6	17.650.
0	Bcom	20.050
1	Bcom	23.550
1	B12	20.050
0	Bcom	23.550
0	B12	20.050
1	Bcom	23.550

1. Create graph for memory function, and write the steps.
2. Create graph for gender and vitamin b with show count of each group, write the steps.
3. Find correlation between memory function and vitamin B.
4. Calculate the number and percent of female with b12._____
5. Calculate the number and percent of male with memory function less 15 .
   _____
6. Calculate the number and percent of Bcom with memory function greater than 15
   ._____
7. Find :

	N	Sum	S.D	Variance	Rang	Max	Min	Mean	Median	Mode
Memory function										

With my beast wishes
Lec. Paxshan A. Hamad

Practice Exam : computer application **B** **Name:**
2nd stage of Chemistry dep.

An investigator is interested in the effects of blood group on memory function. He randomly assigns each of 13 participants. Answer the following questions:

Gender	Blood group	Memory function
0	O	25.550
1	A	21.250
1	O	20.650
0	B	23.050
0	O	28.500
1	A	19.350
1	A	20.650
1	O	28.500
1	A	20.650.
0	O	23.050
1	O	26.550
1	B	23.050
0	O	26.550
0	b	23.050
1	O	26.550

1. Create graph for memory function, and write the steps.
2. Create graph for gender and blood group with show count of each group, write the steps.
3. Find correlation between memory function and gender.
4. Calculate the number and percent of female with B._____
5. Calculate the number and percent of male with memory function less 15 .
   _____
6. Find the number and percent of O with memory function greater than 15
   ._____
7. Find :

	N	Sum	S.D	Variance	Rang	Max	Min	Mean	Median	Mode
Memory function										

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Biostatistics in Research Practice: Sample Exam paper

Notes:
All analysis can be done with SPSS.
All answers should be written on the answer sheet provided. If you wish to provide a rough sketch of a graph, please do.
Answer both questions. Both questions carry equal marks.

1. Dataset 1 contains data on a group of 881 ex-coal miners. There are six variables:

- Years: The number of years that they worked in the coal mining industry.
- Smokes: 1 if the person is a smoker, 0 if not.
- Ex_smokes: 1 if the person is an ex-smoker, 0 if not.
- Age: The age, in years.
- Lgrip: The grip strength of the left hand, in kilograms.
- Rgrip: The grip strength of the right hand, in kilograms.

a) What is the effect, on grip strength, of having worked for longer as a miner? You should statistically control for any variables that you consider appropriate. Describe and concisely report the main points of your analysis. (75 marks)

A regression analysis shows a number of outliers. In particular, case 86 is aged 128, and so should be removed. The other outliers are less extreme, and don't really have any influence.
For the left hand, $R^2 = 0.184$, [F = 49, df = 4, 877], $p < 0.001$. A moderate to large value of R^2. Model results shown below. Students should report B, p, 95% CIs, possibly standardised coefficients, possibly standard error.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	49.486	1.814		27.277	.000	45.925	53.047
years	-.008	.049	-.007	-.158	.875	-.105	.089
Smokes	2.301	.917	.086	2.510	.012	.502	4.101
ex_smokes	1.574	.913	.060	1.725	.085	-.217	3.366
age	-.425	.043	-.425	-9.890	<.001	-.509	-.341

a Dependent Variable: lgrip

Age has a statistically significant and moderate/large negative effect on grip. Smoking (as opposed to not smoking) has a significant positive effect on grip strength.
For the right hand, the story is slightly different. R^2 is considerably lower (0.076), although statistically significant [F = 18, df = 4, 877], $p < 0.001$.

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	51.712	3.085		16.764	.000	45.657	57.766
years	-.014	.084	-.008	-.170	.865	-.179	.150

Smokes	1.156	1.559	.027	.742	.458	-1.903	4.216
ex_smokes	.038	1.552	.001	.024	.981	-3.009	3.084
age	-.428	.073	-.268	-5.862	<.001	-.571	-.285

a Dependent Variable: rgrip

Age is statistically significant. Smoking is not.

b) Please make any other comments on the analysis, relating to, for example, distributions, power, unusual/unexpected results, outliers. (25 marks)

Comments such as:

- Large sample size means that there is a great deal of power.
- Distributions of residuals were approximately normal, but there were some serious outliers, which were obviously errors. These were removed. There were less serious outliers, which, given the sample size will have had no noticeable effect.
- Effect of age was consistent – older men have lower grip.
- Effect of smoking was curious. In the right hand, smoking was associated with higher grip strength. This may be because of an excluded variable – e.g. health, which might persuade people to stop smoking.
- Might mention collinearity between age and years.

2. Dataset 2 contains data on a group of women taking part in a randomised controlled trial to investigate the effects of an education and advice program to prevent hip fracture in older women. The treatment group received advice which comprised of information including: remove all clutter and loose rugs from floors; install hand rails in bathrooms; install night lights; ensure good lighting around the house. Women in the control group received usual care (no systematic advice, although they might pick up information from other sources)..

   The following variables are in the dataset:

   - Group: the group the individual is in - intervention (1) or control (0).
   - Whether the individual smokes (0 – no, 1 = yes). (Smoking is a potential risk factor for hip fracture).
   - Complied: did the person actually make the changes that were suggested? 1 = yes, 0 = no. Not everyone in the intervention group made the changes, and some people in the control group did make the changes.
   - Weight.lbs: Weight in pounds.
   - Hipfract: did the person fracture their hip in the follow up period.

a. What was the relationship between the intervention and compliance with the intervention? Was there any relationship between other predictors of hip fracture and compliance? Describe and concisely report the main points of your analysis.. (50)

Approximately 25% of the intervention group did not make the appropriate changes. 25% of the control group did make the appropriate changes. Highly significant (OR = 8.8, 95% CIs = 6.8, 11.4, $p < 0.001$), but not what you would hope for. People who were heavier or who smoked were less likely to comply with the treatment. This might influence the results, because compliance correlates with predictors of hip fracture.

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
							Lower	Upper
smoke	-.808	.222	13.209	1	.000	.446	.288	.689
weight.lbs	-.023	.003	67.876	1	.000	.978	.972	.983
Constant	1.417	.353	16.145	1	.000	4.124		

a Variable(s) entered on step 1: smoke, weight.lbs.

b. Was the intervention effective? Describe and concisely report the main points of your analysis. (50).

A logistic regression analysis (using either intention to treat, or treatment received) shows that the intervention did not have a statistically significant effect. Student should report effect in OR, and confidence interval, and p-value.

	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
							Lower	Upper
smoke	-.038	.388	.009	1	.923	.963	.451	2.058
weight.lbs	-.022	.006	13.609	1	.000	.978	.967	.990
group	-.244	.286	.726	1	.394	.784	.447	1.373
Constant	-.587	.758	.599	1	.439	.556		

a Variable(s) entered on step 1: smoke, weight.lbs, group.

Intervention was not effective.
If they did treatment received, then the results are:

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95.0% C.I.for EXP(B)	
							Lower	Upper
smoke	-.024	.391	.004	1	.951	.976	.454	2.101
weight.lbs	-.022	.006	12.348	1	.000	.978	.967	.990
complied	.013	.335	.001	1	.969	1.013	.525	1.955
Constant	-.706	.799	.781	1	.377	.493		

a Variable(s) entered on step 1: smoke, weight.lbs, complied.

If they didn't control for other variables, then:

For ITT
$\chi^2 = 0.121$, df = 1, p = 0.728. OR 0.911, 95% CIs 0.538, 1.541
For TR
$\chi^2 = 3.42$, df = 1, p = 0.064. OR 1.692, 95% CIs 0.963, 2.974

A researcher is interested in the effect of an approach to teaching graduate statistics on statistics anxiety. The statistics course offered by the Educational Psychology department is a lecture based course and a computer based course with no lectures. The content of both courses is exactly the same. There are twelve students in each class.

Lecture Based Approach	**Computer Based Approach**	**Gender**	**Favorite hobbies**
10	**27**	**1**	Sport
23	**24**	**1**	Sport
11	**15**	**1**	Sport
17	**19**	**0**	Sport
7	**17**	**0**	Music
4	**21**	**0**	Music
18	**26**	**1**	Music
11	**17**	**1**	Music
11	**20**	**1**	Reading
14	**29**	**0**	Reading
10	**27**	**0**	Reading
19	**22**	**0**	Reading

1- Caret a graph for each of gender and Favorite hobbies. And write the steps.
2- Find correlation between **gender and Lecture Based Approach.**

3- Find **Favorite hobbies** effect on **Computer Based Approach**
4- Find Mean, Mode, Median , SUM ,Variance, N for **Computer Based Approach**

B

A researcher is interested in the effect of an approach to teaching graduate statistics on statistics anxiety. The statistics course offered by the Educational Psychology department is a lecture based course and a computer based course with no lectures. The content of both courses is exactly the same. There are twelve students in each class.

Lecture Based Approach	**Computer Based Approach**	**Gender**	**Favorite hobbies**
10	**27**	**1**	Sport
23	**24**	**1**	Sport
11	**15**	**1**	Sport
17	**19**	**0**	Sport
7	**17**	**0**	Music
4	**21**	**0**	Music
18	**26**	**1**	Music
11	**17**	**1**	Music
11	**20**	**1**	Reading
14	**29**	**0**	Reading
10	**27**	**0**	Reading
19	**22**	**0**	Reading

1- Caret a graph for each of **gender and Favorite hobbies. And write the steps.**
2- Find correlation between **Lecture Based Approach and Lecture Based Approach.**

3- Find **Gender** effect on **Computer Based Approach**
4- Find Mean, Mode, Median , SUM ,Variance, N for **Lecture Based Approach**

Name: **Group:**

Practice Exam : Computer Application **A** **2nd stage of Chemistry dep.**

The effective life (in hours) of batteries is compared by material type (**Zinc-Carbon, Lithium**) and operating temperature: Low (-10˚C), Medium (20˚C) or High (45˚C). Twelve batteries are randomly selected from each material type and are then randomly allocated to each temperature level. The resulting life of all 36 batteries is shown below:

Temperature	**Life of batteries in hour (Zinc-Carbon)**	**Life of batteries in hour(Lithium)**	**Number of Batteries sold**
Low(-10)	130	115	455
Medium(20)	80	75	400
High(45)	58	50	300
Low(-10)	155	135	425
Medium(20)	75	60	380
High(45)	45	30	290
Low(-10)	120	115	435
Medium(20)	93	75	395
High(45)	60	55	280
Low(-10)	180	160	430
Medium(20)	90	85	395
High(45)	40	30	285

a) Find effect of life of the Zinc -carbon batteries on Number of Batteries sold.
b) Find the mean difference between Zinc –carbon and Lithium Batteries.
c) Find temperature effect on life of the Lithium batteries.

With my beast wishes
Lec. Paxshan A. Hamad

Name: **Group:**

Practice Exam : Computer Application **B** **2nd stage of Chemistry dep.**

The relation between juice consumption and daily maximum temperature was examined through 10 days in the restaurant . The following are data about the results.

Day	**Juice consumption (liter)**	**Daily maximum temperature (C^O) Morning**	**Daily maximum temperature (C^O) Afternoon**
Sunday	520	25	23
Monday	534	26	24
Tuesday	610	28	25
Sunday	780	32	31
Monday	708	27	23
Tuesday	639	25	21
Sunday	486	23	20
Monday	423	20	17
Tuesday	452	22	20
Monday	597	29	27

a) Find Daily maximum temperature on Morning effect on juice consumption.
b) Find mean difference of Daily maximum temperature on Morning and Afternoon.
c) Find day effect on juice consumption.

With my beast wishes
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