Computing Practices in Statistics I and Statistics II
Business and Management Degree
Faculty of Economy and Business
University of Barcelona

Full-Time Lecturers

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RIMDA Project. (Recerca, Innovació i Millora de la Docència i l'Aprenentatge).

Introduction

In the following pages we show all the computing practices that we develop in different courses of Statistics that we teach in the Business and Management degree. It covers the following parts of the syllabus:

Practice 1. Statistics I. Descriptive analysis using MicroSoftExcel.
Practice 2. Statistics I. Computing probabilities using MicroSoftExcel.
Practice 1. Statistics II. Computing Confidence Intervals using MicroSoftExcel.
Practice 2. Statistics II. Carrying out statistics test hypothesis using Gretl.

This material is completed with some excel and Gretl files used for the explanation practice that once it has been explained to Students, they will have to develop with a specific dataset built and simulated with your personal NIUB number. As a result, all students must to develop the same activity in computing classroom, but they have to do it with different datasets.

DEPARTMENT OF ECONOMETRICS, STATISTICS AND APPLIED ECONOMY
Business Administration and Management Degree
Statistics I. Computing Practice 1. Descriptive Analysis

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Practice 1: Descriptive Analysis
Available Points: 10 points.
Weight over the final mark: 10%
Assistant Professor: Jordi López-Tamayo

Target of the activity
The activity will consist in computing some statistical results dealing with units 1 to 4. Read carefully the following instructions in order, not only to solve the exercise, but also to upload correctly to the virtual campus your solutions file.

Related Competencies
The competencies that will developed in this activity, as they are specified in the Teaching program of Statistics I are to *Acquire the capacity to use statistical inference tools for decision-making in theoretical and real situations* and to *Knowledge and understanding of basic statistical calculations and the software tools used for them*, in this case MicrosoftExcel.

Technical Instructions and Statement
Student must read this document carefully.
1.   Student must download the file **data_pr1_ [Student's NIUB].xlsx**. This MicrosoftExcel WorkBook is composed by one sheet:

1.1. **DataStudent.** In this sheet the Student will find his/her personal dataset that has been simulated specially for her/him. This database is formed by four variables Age, Wage, Gender (0 Man 1 Woman), Qualified (0 no 1 yes) and four Groups of workers: G1, G2, G3 and G4. Each **sample** of workers has a different size **n** and **different stochastic nature** for each Student. In **Figure 1** you can see the head of this file for Student **99999999.**

Figure 1. Head of the dataset sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	AGE_G1	WAGE_G1	GENDER_G1	QUALIFIED_G1	AGE_G2	WAGE_G2	GENDER_G2	QUALIFIED_G2	AGE_G3	WAGE_G3	GENDER_G3	QUALIFIED_G3	AGE_G4	WAGE_G4	GENDER_G4	QUALIFIED_G4
2	16	2357.6	1	1	25	1869.51	0	0	20	2731.45	1	0	24	1591.39	1	1
3	16	2368.28	0	0	29	1029.88	0	0	21	2717.58	0	1	24	1764.61	0	0
4	16	2264.01	1	1	31	1743.08	0	1	23	2603.79	1	1	25	1808.31	0	1

2.   Student must download the file **template_pr1_ [Studen'ts NIUB].xlsx.** This MicrosoftExcel WorkBook is composed by one sheet:
2.1. **template**. In this sheet the Student will find his/her personal information and the conditions in which the Student will have to develop the activity. Here you have an example in **Figure 2**:

Figure 2. Personal Conditions of the Activity and Statement

	A	B
1	STATEMENT	STUDENT
2	Niub:	99999999
3	Alpha:	0,08
4	Class Group:	1
5	Workers Group:	1
6	Conditioning Gender:	0
7	Group for comparison:	2
8	01.- [0.5 points]. Number of observations for Group G1	
9	02.- [0.5 points]. Mean of Age for Group G1	
10	03.- [0.5 points]. Standard Deviation of Age for Group G1	
11	04.- [0.5 points]. Coefficient of Variation of Age for Group G1	
12	05.- [0.5 points]. Square Root of the Sum of the natural log of Wages for Group G1	
13	06.- [0.5 points]. Covariance betwwen Age and Wage for Group G1	
14	07.- [0.5 points]. Coefficient of Correlation between Age and Wage for Group G1	
15	08.- [0.5 points]. Percentage of Women in Group G1	
16	09.- [1 point]. Number of observations for Group G1 conditioned to Gender=0	
17	10.- [1 point]. Mean of Wage for Group G1 conditioned to Gender=0	
18	11.- [1 point]. Variance of Wage for Group G1 conditioned to Gender=0	
19	12.- [1 point]. Constant of the regression WAGE=a+b*AGE of Group G1	
20	13.- [1 point]. Slope of the regression WAGE=a+b*AGE of Group G1	
21	14.- [1 point]. Ratio of Mean Wage for Group G1 with respect to Group G2	
22	*A VERY IMPORTANT NOTE*	
23	*You must introduce NUMBERS in assigned cells.*	
24	*Neither FORMULAS nor STRING characters are allowed.*	
25	*Pay ATTENTION with the DECIMAL CHARACTER that you use.*	
26	*If you have any doubt type the following formula in cell C7*	
27	*=b8/2. If it works you have a number otherwise you have a string*	

As you can see, here there is information about the student **99999999.** This is his/her **niub** and is the same that the number that identifies the file **data_pr1_99999999.xlsx.** (You can download this demonstration file from virtual campus).

There is also some specific information related and how the student must to develop the activity **(rows 2 to 7)**.

a) If it is required, Student must to obtain his/her computations using a **level of significance (α) of 8%**.

b) This Students belongs to the Class Group 1

c) Must to use information of the group of workers **G1.**

d) In some questions he/she must to obtain conditioned computations by gender. In this case the gender assigned is **0**, so conditioning by **males.**

e) Finally, in some cases he/she must to compare groups, so in this case this student must **to compare his/her group G1 with the group G2.**

All values you enter in the template have to be **rounded to two decimals.**

As you can see in **Figure 2** there are 14 questions **(Rows 8 to 21)** to solve and the student must to enter his/her **numerical** results in the cells assigned   . No other cells of this workbook can be edited or changed. There are clear restrictions in order to enter numerical results in these cells. Read carefully the statement and the *VERY IMPORTANT NOTE (Rows 22 to 27)*.

3. Once the Student has fill the cells with his/her results, he/she has to save the file with the **same name and format** and to upload it to the virtual campus using the corresponding activity link (**Figure 4**) depending on the group that the Student belongs to (A or B, depending on how the class group has been splited). In this case :

Figure 3. Link to upload the activity

Practice 1. Upload. Group 1

Not available unless:
- It is after **6 November 2018, 10:00 AM**
- It is after **6 November 2018, 11:00 AM**

VERY IMPORTANT NOTE (Rows 22 to 27)
If information entered by the Student in the assigned cells is not a number (BE AWARE WITH POINT DECIMAL CHARACTER), change the file name or change the computational format of the file (let's say change it to OpenScal or other Spreadsheets) will be his/her own responsability and his/her activity won't be technically selected and the FINAL MARK WILL BE ZERO.

4. Once the files have been received, the coordinator of the activity will download all files with the solutions of all Students and will correct them publishing a personal report **report_pr1_ [Student's NIUB].pdf** that Student will be able to download from the virtual campus**.** In case of Student **9999999**, in **Figure 4** you can see an example of this report: **report_99999999.xlsx**.

Figure 4. Student's Report of the activity.

DEPARTMENT OF ECONOMETRICS, STATISTICS AND APPLIED ECONOMY

Business Administration and Management Degree
Statistics I. Computing Practice 1. Descriptive Analysis
Correction Date: 2018-07-19 17:47:29
Final Mark: 10   [10 available points]

UNIVERSITAT DE BARCELONA

Student's Information
Niub: 99999999
Alpha: 0.08
Class Group: 1
Workers Group: G1
Conditioning Gender: 0
Group for comparison: G2

Statement	Student's Results	Computed Results	Mark(*)
01.- [0.5 points]. Number of observations for Group G1	427	427	0.5
02.- [0.5 points]. Mean of Age for Group G1	37	37	0.5
03.- [0.5 points]. Standard Deviation of Age for Group G1	14.49	14.49	0.5
04.- [0.5 points]. Coefficient of Variation of Age for Group G1	2.55	2.55	0.5
05.- [0.5 points]. Square Root of the Sum of the natural log of Wages for Group G1	0.44	0.44	0.5
06.- [0.5 points]. Covariance betwwen Age and Wage for Group G1	0.07	0.07	0.5
07.- [0.5 points]. Coefficient of Correlation between Age and Wage for Group G1	38.86	38.86	0.5
08.- [0.5 points]. Percentage of Women in Group G1	0.23	0.23	0.5
09.- [1 point]. Number of observations for Group G1 conditioned to Gender=0	330	330	1
10.- [1 point]. Mean of Wage for Group G1 conditioned to Gender=0	2213.02	2213.02	1
11.- [1 point]. Variance of Wage for Group G1 conditioned to Gender=0	100500.89	100500.89	1
12.- [1 point]. Constant of the regression WAGE=a+b*AGE of Group G1	0.149	0.149	1
13.- [1 point]. Slope of the regression WAGE=a+b*AGE of Group G1	0.002	0.002	1
14.- [1 point]. Ratio of Mean Wage for Group G1 with respect to Group G2	0.61	0.61	1

(*) A tolerance of +/- 5% has been applied.

State of the Practice: Final Mark [X]   Checking [ ]

Revision of the practice: Use teacher's visiting hours. Emails dealing with the practice won't be answered. Thank you.

R-Script by Jordi López-Tamayo, - march 2018 -

DEPARTMENT OF ECONOMETRICS, STATISTICS AND APPLIED ECONOMY
Business Administration and Management Degree
Statistics II. Computing Practice 1. Point and Confidence Interval Estimation

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BARCELONA

Practice 1: Point and Confidence Interval Estimation.
Available Points: 10 points.
Weight over the final mark: 5%
Assistant Professor: Jordi López-Tamayo

Target of the activity

The activity will consist in computing some statistical results dealing with units 1 to 4. Read carefully the following instructions in order, not only to solve the exercise, but also to upload correctly to the virtual campus your solutions file.

Related Competencies

The competencies that will developed in this activity, as they are specified in the Teaching program of Statistics II are to *Acquire the capacity to use statistical inference tools for decision-making in theoretical and real situations* and to *Knowledge and understanding of basic statistical calculations and the software tools used for them*, in this case MicrosoftExcel.

Technical Instructions and Statement

Student must read this document carefully.

1. Student must download the file **data_pr1_ [Student's NIUB].xlsx**. This MicrosoftExcel WorkBook is composed by one sheet:

   1.1. **DataStudent.** In this sheet the Student will find his/her personal dataset that has been simulated specially for her/him. This database is formed by four variables Age, Wage, Gender (0 Man 1 Woman), Qualified (0 no 1 yes) and four Groups of workers: G1, G2, G3 and G4. Each **sample** of workers has a different size **n** and **different stochastic nature** for each Student. In **Figure 1** you can see the head of this file for Student **99999999.**

Figure 1. Head of the dataset sheet

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	AGE_G1	WAGE_G1	GENDER_G1	QUALIFIED_G1	AGE_G2	WAGE_G2	GENDER_G2	QUALIFIED_G2	AGE_G3	WAGE_G3	GENDER_G3	QUALIFIED_G3	AGE_G4	WAGE_G4	GENDER_G4	QUALIFIED_G4
2	16	2357.6	1	1	25	1869.51	0	0	20	2731.45	1	0	24	1591.39	1	1
3	16	2368.28	0	0	29	1029.88	0	0	21	2717.58	0	1	24	1764.61	0	0
4	16	2264.01	1	1	31	1743.08	0	1	23	2603.79	1	1	25	1808.31	0	1

2. Student must download the file **template_pr1_ [Studen'ts NIUB].xlsx.** This MicrosoftExcel WorkBook is composed by one sheet:
   2.1. **template**. In this sheet the Student will find his/her personal information and the conditions in which the Student will have to develop the activity. Here you have an example in **Figure 2**:

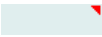**Figure 2. Personal Conditions of the Activity and Statement**

	A	B
1	STATEMENT	STUDENT
2	Niub:	99999999
3	Alpha:	0.08
4	Class Group:	1
5	Workers Group:	1
6	Conditioning Gender:	0
7	Group for comparison:	2
8	01.- [0.5 points]. Number of observations of Group G1	
9	02.- [0.5 points]. Mean of Age of Group G1	
10	03.- [0.5 points]. Conditioned Mean of Age of Group G1/Gender=0	
11	04.- [0.5 points]. Sample Variance of Age of Group G1	
12	05.- [0.5 points]. Conditioned Variance of Age of Group G1/Gender=0	
13	06.- [0.5 points]. Sample Proportion of Women for Group G1	
14	07.- [0.5 points]. Square Root of the Sum of Squares of AGE of Group G1	
15	08.- [0.5 points]. Sum of the Natural Log of AGE of Group G1	
16	09.- [1 point]. C.I. Width for the Mean of the Age of Group G1	
17	10.- [1 point]. C.I. Width for the Variance of the Age of Group G1	
18	11.- [1 point]. C.I. Width for the Proportion of Women of Group G1	
19	12.- [1 point]. C.I. Width for the difference between Age Means by Gender of Group G1	
20	13.- [1 point]. C.I. Width for the difference between Age Variances by Gender of Group G1	
21	14.- [1 point]. C.I. Width for the difference between Women Proportions of Group G1 and Group G2	
22	A VERY IMPORTANT NOTE	
23	You must introduce NUMBERS in assigned cells.	
24	Neither FORMULAS nor STRING characters are allowed.	
25	Pay ATTENTION with the DECIMAL CHARACTER that you use.	
26	If you have any doubt type the following formula in cell C7	
27	=b7/2. If it works you have a number otherwise you have a string	

As you can see, here there is information about the student **99999999**. This is his/her **niub** and is the same that the number that identifies the file **data_pr1_99999999.xlsx.** (You can download this demonstration file from virtual campus).

There is also some specific information related and how the student must to develop the activity **(rows 2 to 7)**.

a) If it is required, Student must to obtain his/her computations using a **level of significance (α) of 8%**.

b) This Students belongs to the Class Group A (1 Group A, 2 Group B)

c) Must to use information of the group of workers **G1.**

d) In some questions he/she must to obtain conditioned computations by gender. In this case the gender assigned is **0**, so conditioning by **males.**

e) Finally, in some cases he/she must to compare groups, so in this case this student must **to compare his/her group G1 with the group G2.**

   All values you enter in the template have to be **rounded to two decimals.**

As you can see in **Figure 2** there are 14 questions **(Rows 8 to 21)** to solve and the student must to enter his/her **numerical** results in the cells assigned _____. No other cells of this workbook can be edited or changed. There are clear restrictions in order to enter numerical results in these cells. Read carefully the statement and the ***VERY IMPORTANT NOTE (Rows 22 to 27).***

3. Once the Student has fill the cells with his/her results, he/she has to save the file with the **same name and format** and to upload it to the virtual campus using the corresponding activity link (**Figure 4**) depending on the group that the Student belongs to (A or B, depending on how the class group has been splitted). In this case :

Figure 3. Link to upload the activity

UpLoad File Practice 1. [Weight 2.5%]
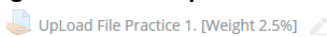
Not available unless:
• You belong to **Group A**
• It is after **26 April 2018, 12:00 PM**
• It is before **26 April 2018, 1:30 PM**

VERY IMPORTANT NOTE (Rows 22 to 27)

If information entered by the Student in the assigned cells is not a number (BE AWARE WITH POINT DECIMAL CHARACTER), change the file name or change the computational format of the file (let's say change it to OpenScal or other Spreadsheets) will be his/her own responsability and his/her activity won't be technically selected and the FINAL MARK WILL BE ZERO.

4. Once the files have been received, the coordinator of the activity will download all files with the solutions of all Students and will correct them publishing a personal report **report_pr1_ [Student's NIUB].pdf** that Student will be able to download from the virtual campus**.** In case of Student **9999999**, in **Figure 4** you can see an example of this report: **report_99999999.xlsx**.

Figure 4. Student's Report of the activity.

DEPARTMENT OF ECONOMETRICS, STATISTICS AND APPLIED ECONOMY

Business Administration and Management Degree

Statistics II. Computing Practice 1. Point and Confidence Interval Estimation

Correction Date: 2018-03-17 17:13:27

Final Mark: 10   [10 available points]

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Student's Information

Niub: 99999999

Alpha: 0.08

Class Group: 1

Workers Group: G1

Conditioning Gender: 0

Group for comparison: G2

Statement	Student's Results	Computed Results	Mark(*)
01.- [0.5 points]. Number of observations of Group G1	442	442	0.5
02.- [0.5 points]. Mean of Age of Group G1	41.38	41.38	0.5
03.- [0.5 points]. Conditioned Mean of Age Group G1/Gender=0	40.51	40.51	0.5
04.- [0.5 points]. Sample Variance of Age of Group G1	200.84	200.84	0.5
05.- [0.5 points]. Conditioned Variance of Age of Group G1/Gender=0	199.08	199.08	0.5
06.- [0.5 points]. Sample Proportion of Women for Group G1	0.47	0.47	0.5
07.- [0.5 points]. Square Root of the Sum of Squares of AGE of Group G1	919.55	919.55	0.5
08.- [0.5 points]. Sum of the Natural Log of AGE of Group G1	1617.11	1617.11	0.5
09.- [1 point]. C.I. Width for the Mean of the Age of Group G1	2.37	2.37	1
10.- [1 point]. C.I. Width for the Variance of the Age of Group G1	47.7	47.7	1
11.- [1 point]. C.I. Width for the Proportion of Women of Group G1	0.08	0.08	1
12.- [1 point]. C.I. Width for the difference between Age Means by Gender of Group G1	4.74	4.74	1
13.- [1 point]. C.I. Width for the difference between Age Variances by Gender of Group G1	0.49	0.49	1
14.- [1 point]. C.I. Width for the difference between Women Proportions of Group G1 and Group G2	0.14	0.14	1

(*) A tolerance of +/- 5% has been applied.

State of the Practice: Final Mark [X]   Checking [ ]

Revision of the practice: Use teacher's visiting hours. Emails dealing with the practice won't be answered. Thank you.

R-Script by Jordi López-Tamayo - march 2018 -

Practice 2: Probability and Random Variables.
Available Points: 10 points.
Weight over the final mark: 10%
Assistant Professor: Jordi López-Tamayo

Target of the activity

The activity will consist in computing some statistical results dealing with units 1 to 4. Read carefully the following instructions in order, not only to solve the exercise, but also to upload correctly to the virtual campus your solutions file.

Related Competencies

The competencies that will developed in this activity, as they are specified in the Teaching program of Statistics I are to *Acquire the capacity to use statistical inference tools for decision-making in theoretical and real situations* and to *Knowledge and understanding of basic statistical calculations and the software tools used for them*, in this case MicrosoftExcel.

Technical Instructions and Statement

Student must read this document carefully.

1. Student must download the file **data_pr1_ [Student's NIUB].xlsx**. This MicrosoftExcel WorkBook is composed by two sheet:

    1.1. **DataStudent.** In this sheet the Student will find his/her personal dataset that has been simulated specially for her/him. In **Figure 1** you can see the information of this file for Student **99999999.**

    Figure 1. Sheet DataStudent. WorkFile data_pr1_ [Student's NIUB].xlsx

	A	B	C
1	1.- Discrete Distribution	Ci	ni
2		0	46
3		1	3
4		2	43
5		3	40
6		4	22
7		5	20
8		6	39
9			
10	2.- Discrete. Binomial Y~Bn(25,0.43)	25	0.43
11	3.- Discrete. Poisson Z~P(5)		5
12	4.- Continuous. Uniform U~U(1;9)	1	9
13	5.- Continuous. Exponential V~E(0.3)		0.3
14	6.- Continuous. Normal W~N(21;4)	21	4
15	7.- E(K)=130		130
16	8.- V(Q)=18		18

    Delivered Information:

    1.- A Frequency table.
    2.- A Discrete binomial distribution with parameters 25 and 0.43
    3.- A Discrete Poisson with parameter equal to 5
    4.- A Continuous Uniform distribution with parameters 1 and 9
    5.- A Continuous Exponential distribution with parameter equal to 0.3
    6.- A Continuous Normal distribution with parameters equal to 21 and 4.
    7.- The Expected value of a random variable equal to 130
    8.- The Variance of a random variable equal to 18.

    1.2. **NumericValues.** In this sheet the Student will find his/her personal conditions related with the file **template_pr1_ [Studen'ts NIUB].xlsx.** that has been simulated specially for her/him. In **Figure 2** you can see the information of this file for Student **99999999.**

    Figure 2. Sheet NumericValues. WorkFile data_pr1_ [Student's NIUB].xlsx

	A	B	C
1	Question	PAR1	PAR2
2	q01		3
3	q02	2	5
4	q03		2
5	q04		8
6	q05	8	13
7	q06		8
8	q07		5
9	q08		7
10	q09	7	9
11	q10		4
12	q11	2	3
13	q12		2
14	q13		10
15	q14		20
16	q15	10	20
17	q16		27
18	q17		26
19	q18	23	25
20	q19		130
21	q20		18

    You will see this information is equal to the information that will appear in your template. This is delivered in order the facilitate your computations in data file.

2. Student must download the file **template_pr1_ [Studen'ts NIUB].xlsx.** This MicrosoftExcel WorkBook is composed by one sheet:

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2.1. **template**. In this sheet the Student will find his/her personal information and the conditions in which the Student will have to develop the activity. Here you have an example in **Figure 3**:

Figure 3. Sheet Template. Personal Conditions of the Activity and Statement (In agreement Numeric Values of previous WorkBook).

STATEMENT	STUDENT
Niub:	99999999
GroupClass:	1
01.- [0.5 points]. Discrete. P(X <= 3)	
02.- [0.5 points]. Discrete. P(2 < X <= 5)	
03.- [0.5 points]. Discrete. P(X > 2)	
04.- [0.5 points]. Discrete. Binomial. P(Y = 8)	
05.- [0.5 points]. Discrete. Binomial. P(8 < Y <= 13)	
06.- [0.5 points]. Discrete. Binomial. P(Y > 8)	
07.- [0.5 points]. Discrete. Poisson. P(Z = 5)	
08.- [0.5 points]. Discrete. Poisson. P(Z > 7)	
09.- [0.5 points]. Discrete. Poisson. P(7 <= Z < 9)	
10.- [0.5 points]. Continuous. Uniform. P(U < 4)	
11.- [0.5 points]. Continuous. Uniform. P(2 < U < 3)	
12.- [0.5 points]. Continuous. Uniform. P(U >= 2)	
13.- [0.5 points]. Continuous. Exponential. P(V > 10)	
14.- [0.5 points]. Continuous. Exponential. P(V < 20)	
15.- [0.5 points]. Continuous. Exponential. P(10 < V < 20)	
16.- [0.5 points]. Continuous. Normal. P(W > 27)	
17.- [0.5 points]. Continuous. Normal. P(W < 26)	
18.- [0.5 points]. Continuous. Normal. P(23 < W < 25)	
19.- [0.5 points]. Given T = 200 + 6*K compute the E(T)	
20.- [0.5 points]. Given H = 50 + 2*Q compute the V(H)	
A VERY IMPORTANT NOTE	
You must introduce NUMBERS in assigned cells.	
Neither FORMULAS nor STRING characters are allowed.	
Pay ATTENTION with the DECIMAL CHARACTER that you use.	
If you have any doubt type the following formula in cell C8	
=b8/2. If it works you have a number otherwise you have a string	

As you can see, here there is information about the student **99999999.** This is his/her **niub** and is the same that the number that identifies the file **data_pr1_99999999.xlsx.** (You can download this demonstration file from virtual campus).

There is also some specific information related and how the student must to develop the activity **(rows 2 and 3)**.
   a) This Students belongs to the Class Group 1
      All values you enter in the template have to be **rounded to three decimals.**

As you can see in **Figure 3** there are 20 questions **(Rows 4 to 23)** to solve and the student must to enter his/her **numerical** results in the cells assigned _____. No other cells of this workbook can be edited or changed. There are clear restrictions in order to enter numerical results in these cells. Read carefully the statement and the ***VERY IMPORTANT NOTE (Rows 24 to 29)***.

3. Once the Student has fill the cells with his/her results, he/she has to save the file with the **same name and format** and to upload it to the virtual campus using the corresponding activity link (**Figure 4**) depending on the group that the Student belongs to (A or B, depending on how the class group has been splited). In this case :

Figure 4. Link to upload the activity

Practice 1. Upload. Group 1

Not available unless:
- It is after **6 November 2018, 10:00 AM**
- It is after **6 November 2018, 11:00 AM**

VERY IMPORTANT NOTE (Rows 24 to 29)
If information entered by the Student in the assigned cells is not a number (BE AWARE WITH POINT DECIMAL CHARACTER), change the file name or change the computational format of the file (let's say change it to OpenScal or other Spreadsheets) will be his/her own responsability and his/her activity won't be technically selected and the FINAL MARK WILL BE ZERO.

4. Once the files have been received, the coordinator of the activity will download all files with the solutions of all Students and will correct them publishing a personal report **report_pr1_ [Student's NIUB].pdf** that Student will be able to download from the virtual campus**.** In case of Student **9999999**, in **Figure 5** you can see an example of this report: **report_99999999.xlsx**.

Figure 5. Student's Report of the activity.

DEPARTMENT OF ECONOMETRICS, STATISTICS AND APPLIED ECONOMY

Business Administration and Management Degree
Statistics I. Computing Practice 2. Probability and Random Variables
Correction Date: 2018-12-13 12:30:41
Final Mark: 9.5   [10 available points]
Student's Information
Niub: 99999999
Class Group: 1

Statement	Student's Results	Computed Results	Mark(*)
01.- [0.5 points]. Discrete. P(X <= 3)	0,62	0,62	0,5
02.- [0.5 points]. Discrete. P(2 < X <= 5)	0,385	0,385	0,5
03.- [0.5 points]. Discrete. P(X > 2)	0,568	0,568	0,5
04.- [0.5 points]. Discrete. Binomial. P(Y = 8)	0,089	0,089	0,5
05.- [0.5 points]. Discrete. Binomial. P(8 < Y <= 13)	0,684	0,684	0,5
06.- [0.5 points]. Discrete. Binomial. P(Y > 8)	0,818	0,818	0,5
07.- [0.5 points]. Discrete. Poisson. P(Z = 5)	0,175	0,175	0,5
08.- [0.5 points]. Discrete. Poisson. P(Z > 7)	0,133	0,133	0,5
09.- [0.5 points]. Discrete. Poisson. P(7 <= Z < 9)	0,133	0,17	0
10.- [0.5 points]. Continuous. Uniform. P(U < 4)	0,375	0,375	0,5
11.- [0.5 points]. Continuous. Uniform. P(2 < U < 3)	0,125	0,125	0,5
12.- [0.5 points]. Continuous. Uniform. P(U >= 2)	0,875	0,875	0,5
13.- [0.5 points]. Continuous. Exponential. P(V > 10)	0,05	0,05	0,5
14.- [0.5 points]. Continuous. Exponential. P(V < 20)	0,998	0,998	0,5
15.- [0.5 points]. Continuous. Exponential. P(10 < V < 20)	0,047	0,047	0,5
16.- [0.5 points]. Continuous. Normal. P(W > 27)	0,067	0,067	0,5
17.- [0.5 points]. Continuous. Normal. P(W < 26)	0,894	0,894	0,5
18.- [0.5 points]. Continuous. Normal. P(23 < W < 25)	0,15	0,15	0,5
19.- [0.5 points]. Given T = 200 + 6*K compute the E(T)	980	980	0,5
20.- [0.5 points]. Given H = 50 + 2*Q compute the V(H)	72	72	0,5

(*) A tolerance of +/- 5% has been applied.

State of the Practice: Final Mark [X]   Checking [ ]

Revision of the practice: Use teacher's visiting hours. Emails dealing with the practice won't be answered. Thank you.

R-Script by Jordi López-Tamayo, - July 2019 -

DEPARTMENT OF ECONOMETRICS, STATISTICS AND APPLIED ECONOMY
Business Administration and Management Degree
Statistics II. Computing Practice 2. Parametric and NonParametric Hypothesis Testing

UNIVERSITAT DE BARCELONA

Practice 2: Parametric and NonParametric Hypothesis Testing.
Available Points: 10 points.
Weight over the final mark: 5%
Assistant Professor: Jordi López-Tamayo

Target of the activity
The activity will consist in computing some statistical results dealing with units 1 to 4. Read carefully the following instructions in order, not only to solve the exercise, but also to upload correctly to the virtual campus your solutions file.

Related Competencies
The competencies that will developed in this activity, as they are specified in the Teaching program of Statistics II are to *Acquire the capacity to use statistical inference tools for decision-making in theoretical and real situations* and to *Knowledge and understanding of basic statistical calculations and the software tools used for them*, in this case MicrosoftExcel.

Technical Instructions and Statement
1. Student must read this document carefully.
2. Student must download the file **data_pr2_ [Student's NIUB].gdt**. This is a Gretl data file and is composed by the following variables four variables Age, Wage, Gender (0 Man 1 Woman), Qualified (0 no 1 yes) and four Groups of workers: G1, G2, G3 and G4. Each **sample** of workers has a different size **n** and **different stochastic nature** for each Student. In **Figure 1** you can see the head of this file for Student **99999999**

Figure 1. Gretl dataset

3. Student must download the file **template_pr2_ [Studen'ts NIUB].xlsx**. This MicrosoftExcel WorkBook is composed by one sheet:
   3.1. **template**. In this sheet the Student will find his/her personal information and the conditions in which the Student will have to develop the activity. Here you have an example in **Figure 2**:
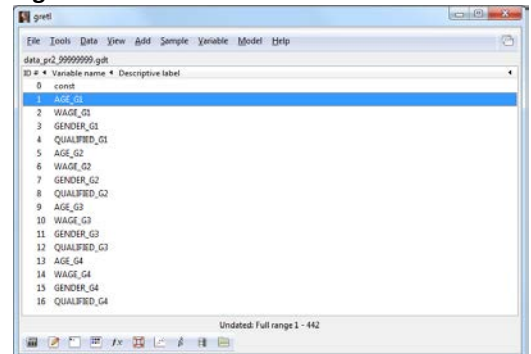
Figure 2. Personal Conditions of the Activity and Statement

	A	B
1	STATEMENT	STUDENT
2	Niub:	99999999
3	Alpha:	0.08
4	Class Group:	1
5	Workers Group:	1
6	Conditioning Gender:	0
7	Conditioning Qualification:	1
8	Group for comparison:	2
9	Mean for H1 in Point 08:	2277
10	01.- [0.5 points]. Number of observations of Group G1	
11	02.- [0.5 points]. Coeficient of Variation of Wage of Group G1	
12	03.- [0.5 points]. Interquartile Range of Wage of Group G1/Gender=0	
13	04.- [0.5 points]. Conditioned Median of Wage of G1/Qualified=1	
14	05.- [0.5 points]. Pearson's coeficient of correlation between Age and Wage of Group G1	
15	06.- [0.5 points]. Shapiro-Wilk's normality test in case of the Wage of G1	
16	07.- [0.5 points]. Chi-Square Statistic to test independence between GENDER_G1 and QUALIFIED_G1	
17	08.- [0.5 points]. If you do not reject the two-sided H0:Mean[WAGE_G1]=2277 enter 0. Otherwise enter 1	
18	09.1.- [1 point]. Test statistic for two-sided test H0: Mean[Wages/QUALIFIED=0] - Mean[Wages/QUALIFIED=1] = 0 in G1 (Unknown and Unequal vars)	
19	09.2.- [1 point]. Do you reject the null hypothesis with alpha=0.08? If do not reject enter 0, otherwise enter 1	
20	10.1- [1 point]. Test statistic for two-sided test H0: Var[Wages/QUALIFIED=0] / var[Wages/QUALIFIED=1] = 1 in G1	
21	10.2- [1 point]. Do you reject the null hypothesis with alpha=0.08? If do not reject enter 0, otherwise enter 1	
22	11.1- [1 point]. Test statistic for two-sided test H0: Proportion[QUALIFIED_G1] - Proportion[QUALIFIED_G2 = 0	
23	11.2- [1 point]. Do you reject the null hypothesis with alpha=0.08? If do not reject enter 0, otherwise enter 1	
24	*A VERY IMPORTANT NOTE*	
25	*You must introduce NUMBERS in assigned cells.*	
26	*Neither FORMULAS nor STRING characters are allowed.*	
27	*Pay ATTENTION with the DECIMAL CHARACTER that you use.*	
28	*If you have any doubt type the following formula in cell C7*	
29	*=b8/2. If it works you have a number otherwise you have a string*	
30		

As you can see, here there is information about the student **99999999.** This is his/her **niub** and is the same that the number that identifies the file **data_pr2_99999999.xlsx.** (You can download this demonstration file from virtual campus).
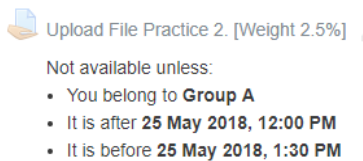
There is also some specific information related and how the student must to develop the activity **(rows 2 to 8)**.

a) If it is required, Student must to obtain his/her computations using a **level of significance (α) of 8%**.

b) This Student belongs to the Class Group 1 (1 **Group A** and 2 Group B).

c) Must to use information of the group of workers **G1.**

d) In some questions he/she must to obtain conditioned computations by gender. In this case the gender assigned is **0**, so conditioning by **males.**

e) In some cases, he/she must to compare groups, so in this case this student must **to compare his/her group G1 with the group G2.**

f) Finally, a value for the null hypothesis in point 08 is given. **In this case 2277.**

g) All values you enter in the template have to be **rounded to three decimals**

As you can see in **Figure 2** there are 14 questions **(Rows 9 to 22)** to solve and the student must to enter his/her **numerical** results in the cells assigned _____. No other cells of this workbook can be edited or changed. There are clear restrictions in order to enter numerical results in these cells. Read carefully the statement and the *VERY IMPORTANT NOTE (Rows 23 to 28).*

4. Once the Student has fill the cells with his/her results, he/she has to save the file with the **same name and format** and to upload it to the virtual campus using the corresponding activity link (**Figure 3**) depending on the group that the Student belongs to (A or B, depending on how the class group has been splited). In this case :

Figure 3. Link to upload the activity

Upload File Practice 2. [Weight 2.5%]

Not available unless:
- You belong to **Group A**
- It is after **25 May 2018, 12:00 PM**
- It is before **25 May 2018, 1:30 PM**

VERY IMPORTANT NOTE (Rows 23 to 28)
If information entered by the Student in the assigned cells is not a number (BE AWARE WITH POINT DECIMAL CHARACTER), change the file name or change the computational format of the file (let's say change it to OpenScal or other Spreadsheets) will be his/her own responsability and his/her activity won't be technically selected and the FINAL MARK WILL BE ZERO.

5. Once the files have been received, the coordinator of the activity will download all files with the solutions of all Students and will correct them publishing a personal report **report_pr2_ [Student's NIUB].pdf** that Student will be able to download from the virtual campus. In case of Student **9999999**, in **Figure 4** (**next page**) you can see an example of this report: **report_99999999.xlsx**.

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Figure 4. Student's Report of the activity.

DEPARTMENT OF ECONOMETRICS, STATISTICS AND APPLIED ECONOMY
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Correction Date: 2018-05-13 09:23:00
Final Mark: 10   [10 available points]

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BARCELONA

Student's Information
Niub: 99999999
Alpha: 0.08
Class Group: 1
Workers Group: 1
Conditioning Gender: 0
Conditioning Qualification: 1
Group for comparison:2
Mean for H1 in Point 08: 2277

Statement	S[*]	C[*]	M[*]
01.- [0.5 points]. Number of observations of Group G1	427	427	0.5
02.- [0.5 points]. Coeficient of Variation of Wage of Group G1	0.108	0.108	0.5
03.- [0.5 points]. Interquartile Range of Wage of Group G1/Gender=0	158.68	157.212	0.5
04.- [0.5 points]. Conditioned Median of Wage of G1/Qualified=1	2357	2356.965	0.5
05.- [0.5 points]. Pearson's coeficient of correlation between Age and Wage of Group G1	-0.213	-0.213	0.5
06.- [0.5 points]. Shapiro-Wilk's normality test in case of the Wage of G1	0.867	0.867	0.5
07.- [0.5 points]. Chi-Square Statistic to test independence between GENDER_G1 and QUALIFIED_G1	0.342	0.342	0.5
08.- [0.5 points]. If you do not reject the two-sided H0:Mean[WAGE_G1]=2277 enter 0. Otherwise enter 1	0	0	0.5
09.1.- [1 point]. Test statistic for two-sided test H0: Mean[Wages/QUALIFIED=0] - Mean[Wages/QUALIFIED=1] = 0 in G1 (Unknown and Unequal vars)	-0.365	-0.365	1
09.2.- [1 point]. Do you reject the null hypothesis with alpha=0.08? If do not reject enter 0, otherwise enter 1	0	0	1
10.1- [1 point]. Test statistic for two-sided test H0: var[Wages/QUALIFIED=0] / var[Wages/QUALIFIED=1] = 1 in G1	0.883	0.883	1
10.2- [1 point]. Do you reject the null hypothesis with alpha=0.08? If do not reject enter 0, otherwise enter 1	0	0	1
11.2- [1 point]. Test statistic for two-sided test H0: Proportion[QUALIFIED_G1] - Proportion[QUALIFIED_G2 = 0	-2.475	-2.475	1
11.2- [1 point]. Do you reject the null hypothesis with alpha=0.08? If do not reject enter 0, otherwise enter 1	1	1	1

[*] S indicates Student's Results, C Computed Results and M the Mark. A tolerance of +/- 5% has been applied.

State of the Practice: Final Mark [X]   Checking [ ]

Revision of the practice: Use teacher's visiting hours. Emails dealing with the practice won't be answered. Thank you.