Laboratorio Economia e Finanza

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Prologue and Lecture 1

Information

- My contact information
- Email: mdelogu@uniss.it, website: https://sites.google.com/site/mrcdelogu/
- For any information regarding course: write me an email, I answer promptly
- Meeting: available, tuesday afternoon, room F7. However, I am available at any time, better to write me an email in advance
- I'm going to share to you all the material through the UNISS online platform

What is this course about?

1. Fundamentals
   - 1.1 Introduction to Excel and its functions. Why EXCEL? Wherever you go to work you will have to deal with EXCEL. Better to learn to use this software efficiently
   - 1.2 Arguments: Import data, Pivot tables, Functions, Vlookup, Match & Index, Pivot Tables, record a macro
   - 1.3 Introduction to Visual Basic: write a user- built function and introduction to to loops
2. Loops and VBA with examples
   - 2.1 Heuristic derivation of the Poisson distribution along with its key properties. Digression about Interest Rates
   - 2.2 Definition of a Football Prediction Model. Implementation in EXCEL (building of VBA routines to automatize tasks
   - 2.3 Multinomial Logit Model with capacity constraints. Implementation in Excel of the De Palma Algorithm
3. Finance
   - 3.1 Principles of Quantitative Finance with applications
   - 3.2 Montecarlo Simulation
   - 3.3 Binomial Trees and Arbitrage
   - 3.4 Introduction to Stochastic Processes: random behavior of assets, Brownian motion and Black-Scholes Formula

Problem solving approach

- We are going to cover many topics..but we do not have much time..
- Even though the focus is in the application our analysis will not lack rigor ..
- Focus on the practical solution
- Tools:
  - Microsoft Excel with VBA: VBA stands for Visual Basic for Application and is the Microsoft's programming language for Excel. we are going to learn a bit of Visual Basic... The aim of the class is not to teach you solid programming skills.. you are not going to be a computer scientist. However you will see that it is not impossible to write few lines of code! We are going also to work a bit on Python, Stata
- Good to remember: it is very likely that once you have a problem... the solution is already available in internet! usually not identical but pretty close and with just few changes it should fit your problem!

Main References

- Books and Papers
  - David Noel Burghes, Statistics, Heinemann, 1994
  - Discrete Choice models with capacity constraints.. de Palma et al., Journal of Urban Economics (2007)
  - Paul Wilmott, Paul Wilmott introduces Quantitative Finance, 2n edition 2007
  - John Hull, Options Futures and Derivatives, 2010
- Feel free to ask, I am available to suggest you other references

Important: To succeed at the exam, slides are enough! Slides will be available to you at the end of each week

Exam and Other Details (1)

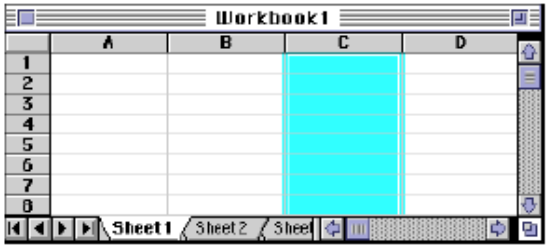
- Please don't be too much stressed about the exam. Pay attention during the class and do a bit of work at home.
- Use your time to make questions about the course and the topics.. not about the exam structure and grades!
- The next slide details the exam structure, which is also described in the syllabus
- I will provide you a specimen of the exam
- If you have a laptop please bring it with you!
- I may suggest you to work on the solution of some exercises. Nonetheless, you will not be obliged to work on their solution. At the same time, notice that to work on these exercises will increase the likelihood of obtaining a top grade at the final exam. I may provide solutions of the exercises in class.

Exam (2)

- The exam is made up by 3 parts:
  1. **10 Multiple choice** questions. This part is worth 10 points out of the 30 available
  2. **1 Theoretical Question**. You are supposed to provide a concise answer using a little more than half of a page. You can choose your question among two. This part is worth 10 points out of the 30 available
  3. **1 Excercise**. You will choose which exercise to solve among two. This part is worth 10 points
- Dates
  - As soon as possible I let you know
  - Yes...we may have an exam just at the end of the course

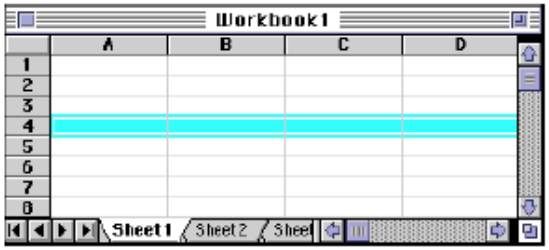
- I am going to do a very short recap about the main features Microsoft Excel. I know that you already have some basic knowledge..however if you don't know... no worries
- Also, as far as I know it was the subject of a compulsory exam that you had at your first cycle... However let's do a quick recap
- What is a Spreadsheet: it is a grid made by columns and rows. You can make computations very easily
- The intersections between columns and rows are called cells!...Into the cells you can insert, numbers, texts and formulas

Intro (2)



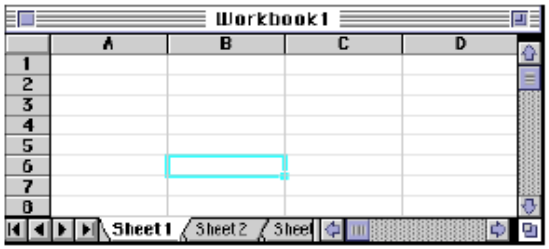
Letters denote a columns location.

e.g., column C



Numbers denote a rows location.

e.g., row 4



Cells are denoted by the

Column and the row.

e.g., cell B6

Operation	Symbol	Constants	References	Result
Multiplication	*	= 5 * 6	= A1 * B3	30
Division	/	= 8 / 4	= A3 / B2	2
Addition	+	= 4 + 7	= B2 + A2	11
Subtraction	-	= 8 – 3	= A3 - B1	5

Select Cells

- Imagine that you want to make the sum of the cells A1+A5+A6 and report the result in cells A2
- You can type in A2: "=A1+A5+A6"... or use the SUM FUNCTION...=SUM(A1,A5, A6)...learn to use the ctrl key
- Imagine that you want to obtain the sum of the numbers from cells A5 till cells A300...then much better to write =SUM(A1:A300)
- Important..I teach using Microsoft Excel in English...why? much better to use the English version, you may end up working for a multinational or work in a diverse team.. English is the current *lingua franca* and it is better to know the formulas in such language...
- If you plan to follow this class with your laptop, please change the language. Follow instructions at : changelanguage

Activate Macro

- In the next part of the course we are going to build and use Macros and VBA routines. This feature may not been activated in your laptop.
- What is a Macro?: If you have tasks in Microsoft Excel that you do repeatedly, you can record a macro to automate those tasks. A macro is an action or a set of actions that you can run as many times as you wish. When you create a macro, you are merely recording your mouse clicks and keystrokes. However we sometimes use this term to refer to user written code
- Please activate it, follow the next link if you are in trouble
- Go to macro

Some Built-in Functions

- sum, average, count
- If, iferror
- if with logical operator.
- Operation with string: left, right, len
- You shall refer to the excel file labeled *lecture1*
- All the formulas used can be found in the EXCEL file I share with you through the Moodle Platform

A first (easy) Application

- Let's make the list of the students enrolled at this class
- Compute some averages
- Use the count function to count the number of observations
- Use the *iferror* to deal with errors. Can you divide for zero?

Logical Operators

- Sometimes we need to apply a function only in some cases or when a condition holds....Therefore we need to use the *Logical Operators*
- We can do a lot of things just using the two basic operator *And, Or*
- **And operator** gives true when both conditions holds
- **Or operator** is *True* when only one condition holds (among the many that we may want to check) holds

VBA code: A summary sheet

- What we just did was a short recap of the main properties of Excel.. I hope that it was not all new for you all! It was just a quick refreshment
- A first look into VBA: How to create a summary sheet which list the names of sheets contained in the workbook..
- You can do it by hand...but depending on the size of the workbook you will spend hours in the office...
- and easily you'll make mistakes
- How to go out from such trouble? Learn a bit of VBA
- With few line of codes: (1) save a lot of time and (2) do a better job
- The next slide is just as an example, it is reported just to give of the some of the stuff that the class covers of. Don't be scared if you don't understand (it's obvious!, you are here, I suppose, to learn something new

Example

```
Sub SheetNames()

Name = Summary

Worksheets.Add(After:=Worksheets(Worksheets.Count)).Name = Name

For i = 1 To Sheets.Count - 1

name1 = Sheets(i).Name

Worksheets(Name).Cells(i, 1) = Sheets(i).Name

Next i

Worksheets(Name).Cells(1, 4) = Worksheets(Name).Cells(Rows.Count,
A).End(xlUp).Row

End Sub
```

A short explanation

- the module reported in the previous slides does the following:
- Create a new worksheet, where we aim to list the names of all the previous existent worksheets.
- Exploits some methods of some objects...
- Makes a Loop able to skim trough the already existent sheets...
- Finally, report the number of the worksheet contained in the workbook

Why is useful

- we do not rely to our attention... no mistakes..
- There are plenty of already existent solution in internet... just learn the ability to look for the one that better suits your purposes
- To do the stuff by hand will require a lot of time ... if you don't want to spend 16 hours in the office the only way to survive is to learn the ability to employ Visual Basic

Next Lecture

- We will learn other fundamental functions of Excel: Vlookup (CERCA.VERTICALE)
- We learn to look with multiple criteria using an Array Formula (INDEX and MATCH jointly)
- Learn to use some special features of EXCEL: FILTERS , Tables
- Pivot Tables

Thanks for your attention!

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