

Munster Programming Training



Objectives

1. To give a short and basic introduction to computer programming, web design, web animation and video production.
2. To foster interest in computers by encouraging young students to learn about programming at an early age.
3. To prepare them for programming competitions.
4. To deliver a web design and video competitions for the Munster area.

Structure

- The plan is to have:
- 26 training sessions – Saturdays between 10 am – 1 pm.
 - To participate in All Irish Programming Olympiad (AIPO) competition.
 - MPT competition for web design and video production.
 - To carry on next year with Cycle 2
- Structure of the day is:
- Formal lecture between 10 and 11.20
 - Break between 11.20 and 11.40.
 - Practical session between 11.40-13.00
- Weekly homework – 3-4 programs to solve.

Account Information Page

Your User Name = combination of your initials and a number.
Password is automatically generated.

You use this name to:
- log on the computers.

Change the password to something simple to recall.

Resources – Your Account

Your account = Space on the CS Server.
Log on the CS Domain with the username and password.
You will see various units:

- c: → local HD
- d: → external CD
- z: → your home account

Organise your home account to fit your needs
Labs → to keep the work week by week
public_html → for your webpage

Resources – Your Web Space

Your account = web address: <http://cs1.ucc.ie/~ab12>
How to access your web space:
- go to your home account z:
- go to the folder public_html
- you have a file index.html.
- the index page to what your web space contains.
- soon you will develop more.

What can we do with computers?

Computers are part of our live.

- Email, internet, chat, etc.
- Entertaining: games, video, music, etc.
- Serious applications: banking, simulation

Computer Architecture:

- Keyboard, screen, mouse, main box.
- Main box = internal memory, external memory, processor, CD, ports

Computer Software:

- Operating system: Windows, iOS, Linux
- Tools and applications: word, excel, IE browser etc.

How software is made? **PROGRAMMING**

Programming languages?

Programming languages

- Communicate to computers what to execute.
- Give the code (instructions) in "English"-like words.
- Compiled languages:
 - Compile the code to generate a new code in "machine" words (0,1).
 - Execute the compiled file.
- Interpreted languages:
 - Execute/Interpret the original code line after line.

C, C++, C# are C based compiled languages.

Java is a compiled language.

Javascript is an interpreted language for the web programming.

Python

Python is an interpreted language very used in industry (Google).

Python's name come from the Monty Python TV series.

Python programming language is:

- Interpreted → execution takes place line after line.
- Structured → write functions / methods
- Object Oriented → write our own classes

Python is very versatile:

- ☑ Used in large scientific problems (bioinformatics)
- ☑ Used in internet, networking, database applications

Python is now the language of choice for beginners.

Python Environment

What do we need for the Python classes?

- 1. www.python.org is the official python page.
- 2. Python Tutorial from <https://docs.python.org/3/tutorial/index.html>
- 3. Some other books you fancy from there

What do we need to install for Python

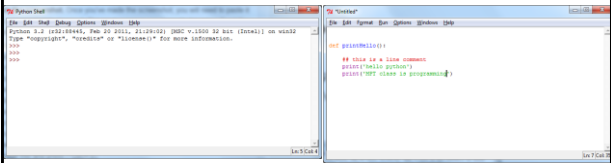
- 1. Python 3.* installed on the machines
- 2. 'Idle' GUI tool installed on the machines

Python Idle Tool

GUI tool to develop and interpret Python modules.

Two different windows:

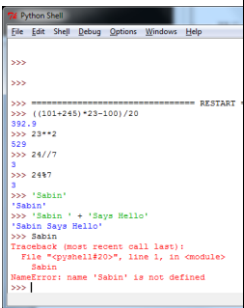
- 1. Interpreter windows for executions
- 2. Editing window for developing / writing modules



Python Idle Tool

Python Interpreter Window:

- ☑ Do any interpreting for python modules.
- ☑ Simple or complicated maths calculations.
- ☑ Simple or complicated string/text processing.
- ☑ Play with variables.
- ☑ Do print using the print() function.



Python Idle Tool

What you are seeing in there:

- ☞ Calculations with brackets (?)
 - ☞ +, -, /, * for the basic arithmetical operations
 - ☞ ** for the power operation
 - ☞ // is the result of integer division
 - ☞ % is the remainder of integer division
- ☞ String
 - ☞ Something in between ' ' or " "
 - ☞ 'Sabin' is a string but Sabin is not (see an error)
 - ☞ 'Sabin' + 'Says Hello' → concatenates the strings
- ☞ We will see more during the lab

```
Python Shell
File Edit Shell Debug Options Windows Help

>>>
>>>
>>> ===== RESTART =====
>>> (101+245)*23-100/20
382.9
>>> 23**2
529
>>> 241//7
3
>>> 2487
3
>>> 'Sabin'
'Sabin'
>>> 'Sabin' + 'Says Hello'
'Sabin Says Hello'
>>> Sabin
Traceback (most recent call last):
  File "c:\python\lib\idlelib\shell.py", line 1, in <module>
    Sabin
NameError: name 'Sabin' is not defined
>>>
```

Python Variables

Python variables are elements that:

- ☞ Have an name (identifier)
- ☞ Must have values.
- ☞ Values identify their nature

Rules to name a variable:

- ☞ Use only letters and digits 0-9 and _
- ☞ Do not start with a digit
- ☞ Do not use Python Key words

More on that soon.

```
Python Shell
File Edit Shell Debug Options Windows Help

NameError: name 'Sabin' is not defined
>>> ===== RESTART =====
>>> a=10
>>> a
10
>>> b=a
>>> b
10
>>> c
Traceback (most recent call last):
  File "c:\python\lib\idlelib\shell.py", line 1, in <module>
    c
NameError: name 'c' is not defined
>>> sabin = 'sabin'
>>> sabin
'sabin'
>>> lecturerName = 'Sabin Tabirca'
>>> lecturerName
'Sabin Tabirca'
>>> lecturerName
Traceback (most recent call last):
  File "c:\python\lib\idlelib\shell.py", line 1, in <module>
    lecturerName
NameError: name 'lecturerName' is not defined
>>> lecturerName
Traceback (most recent call last):
  File "c:\python\lib\idlelib\shell.py", line 1, in <module>
    lecturerName
NameError: name 'lecturerName' is not defined
>>> sabin Tabirca
>>> print(lecturerName)
Sabin Tabirca
>>> print('MYT Lecturer name is', lecturerName)
MYT Lecturer name is Sabin Tabirca
>>>
```

Python Variables

What you see?

- ☞ A variable called a with the value 10.
- ☞ A variable b with the value of a.
- ☞ A variable c with no value → ERROR
- ☞ A variable sabin with the value 'sabin'
- ☞ A variable lecturerName with ?
- ☞ Spelling must be correct and cased?
 - ☞ Python is case-sensitive
- ☞ print() is a function that prints.

```
Python Shell
File Edit Shell Debug Options Windows Help

NameError: name 'Sabin' is not defined
>>> ===== RESTART =====
>>> a=10
>>> a
10
>>> b=a
>>> b
10
>>> c
Traceback (most recent call last):
  File "c:\python\lib\idlelib\shell.py", line 1, in <module>
    c
NameError: name 'c' is not defined
>>> sabin = 'sabin'
>>> sabin
'sabin'
>>> lecturerName = 'Sabin Tabirca'
>>> lecturerName
'Sabin Tabirca'
>>> lecturerName
Traceback (most recent call last):
  File "c:\python\lib\idlelib\shell.py", line 1, in <module>
    lecturerName
NameError: name 'lecturerName' is not defined
>>> lecturerName
Traceback (most recent call last):
  File "c:\python\lib\idlelib\shell.py", line 1, in <module>
    lecturerName
NameError: name 'lecturerName' is not defined
>>> sabin Tabirca
>>> print(lecturerName)
Sabin Tabirca
>>> print('MYT Lecturer name is', lecturerName)
MYT Lecturer name is Sabin Tabirca
>>>
```

To do List

- 1. Install Python your home/school computers.
- 2. Write a Python function to print a funny face.
