HKUST Future-Ready Scholars

Introduction to Game Programming using Python

Part 1: Number Guessing Game

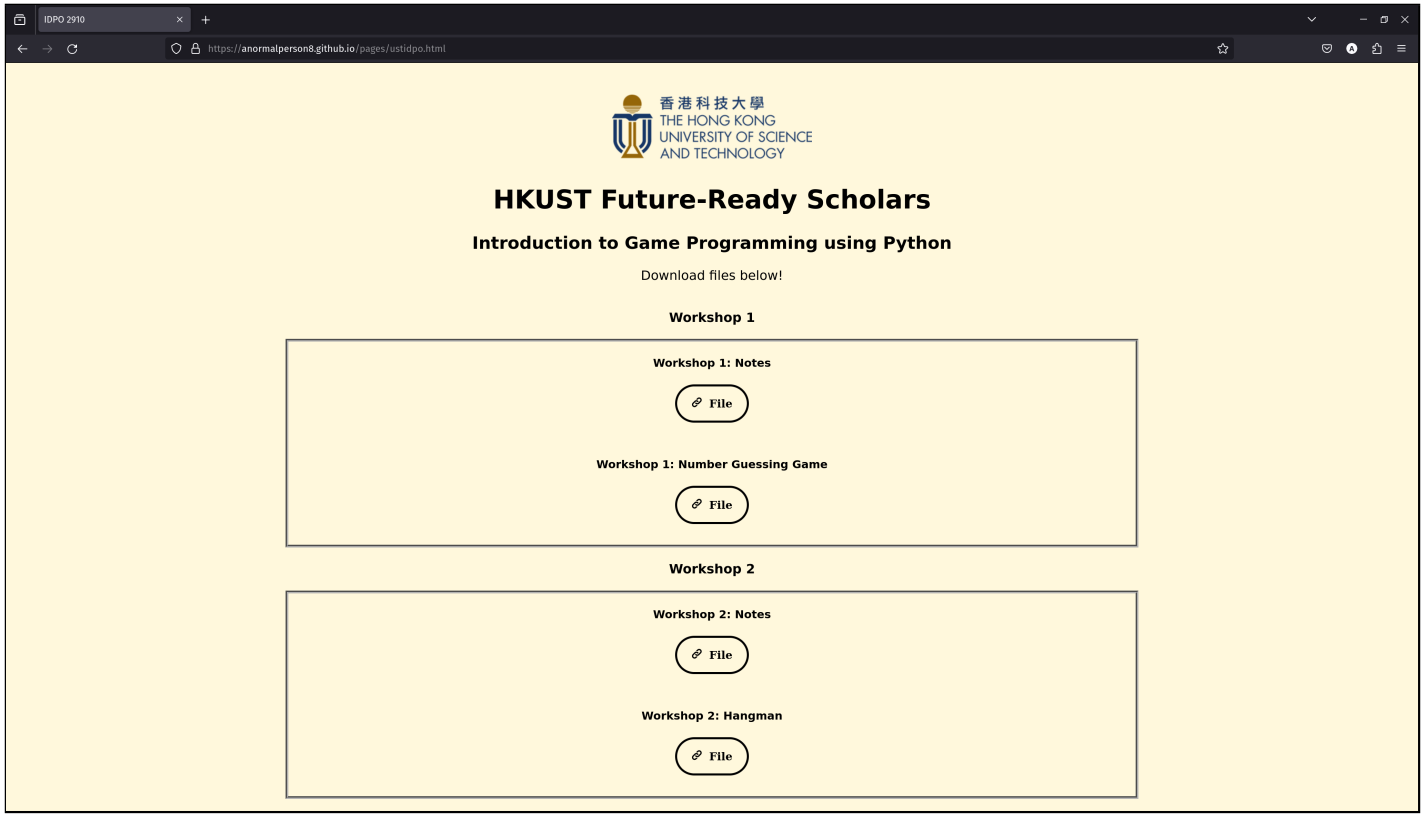
20 April 2024

Google Colab

We will use Google Colab for the workshops.
https://colab.research.google.com/
You must have a Gmail account for it, create one if you do not.

Files

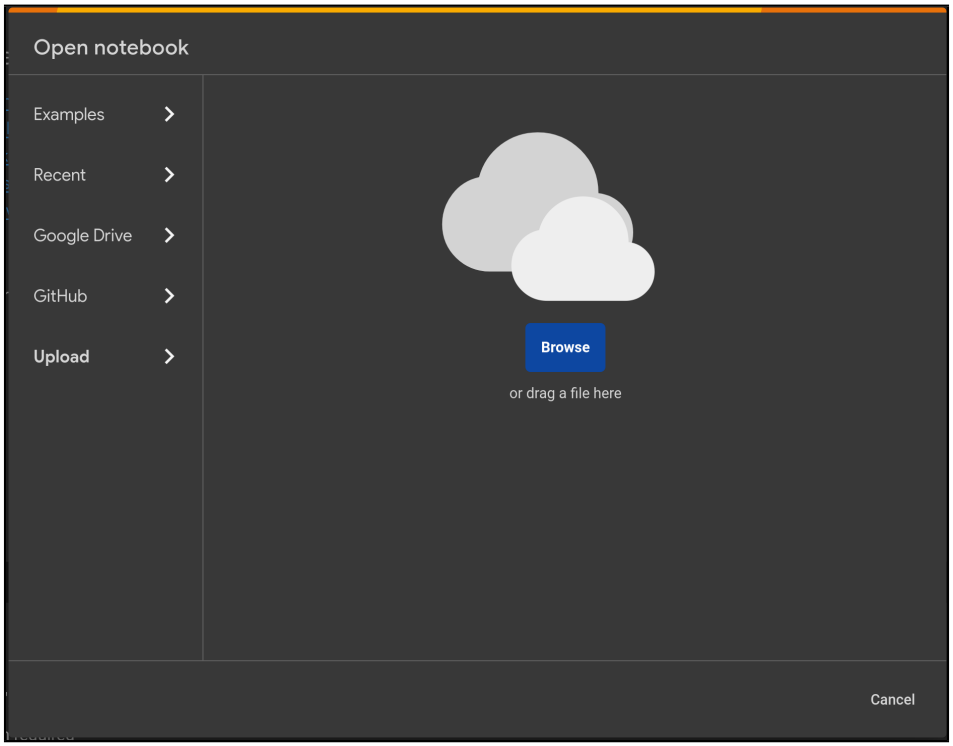
All materials today are at:
https://bit.ly/ustidpo



Download all files that belong to **Workshop 1** today.

Jupyter Notebook

Now upload your Jupyter Notebook file with **Files** → **Open Notebook**.



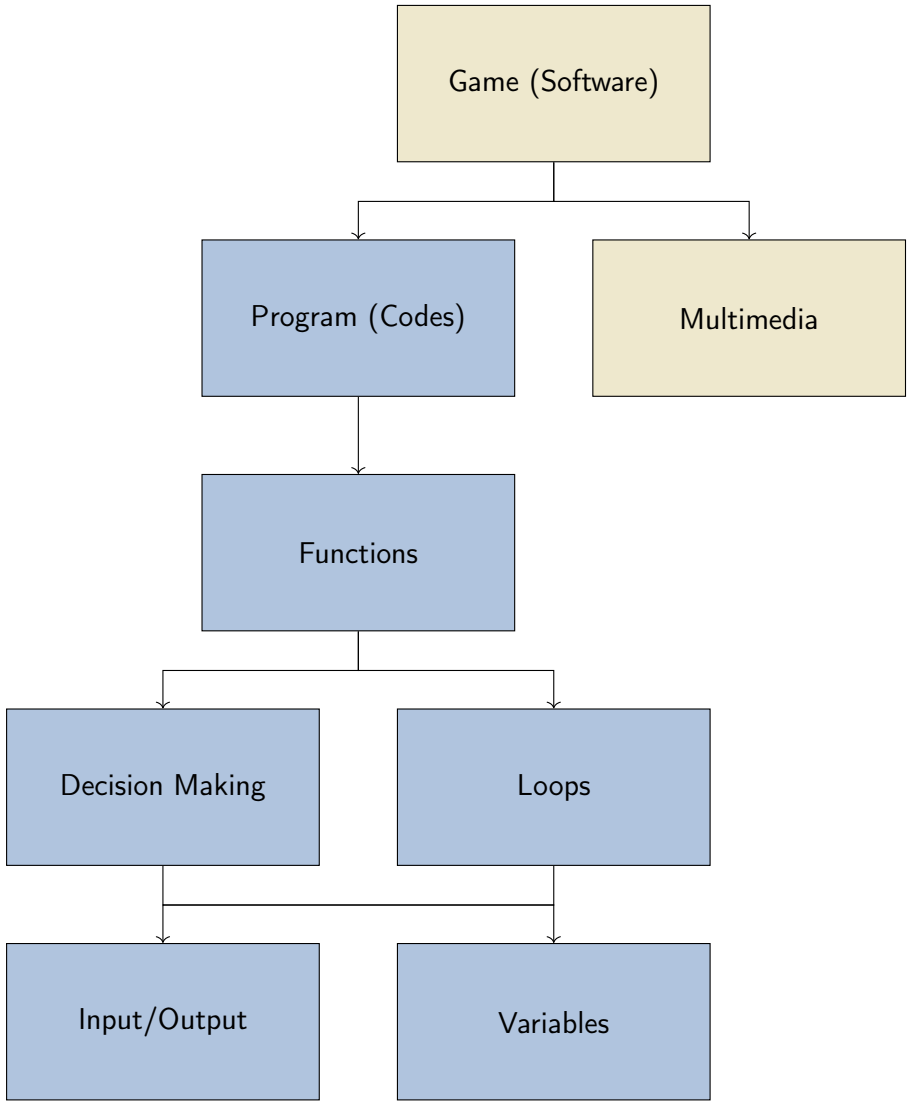
Upload the file **Number-Guessing.ipynb**.

Using Jupyter Notebook

You can type your code in these blocks. We call these blocks code cells.

You can run a code cell with the button on the left.

World of Game Coding

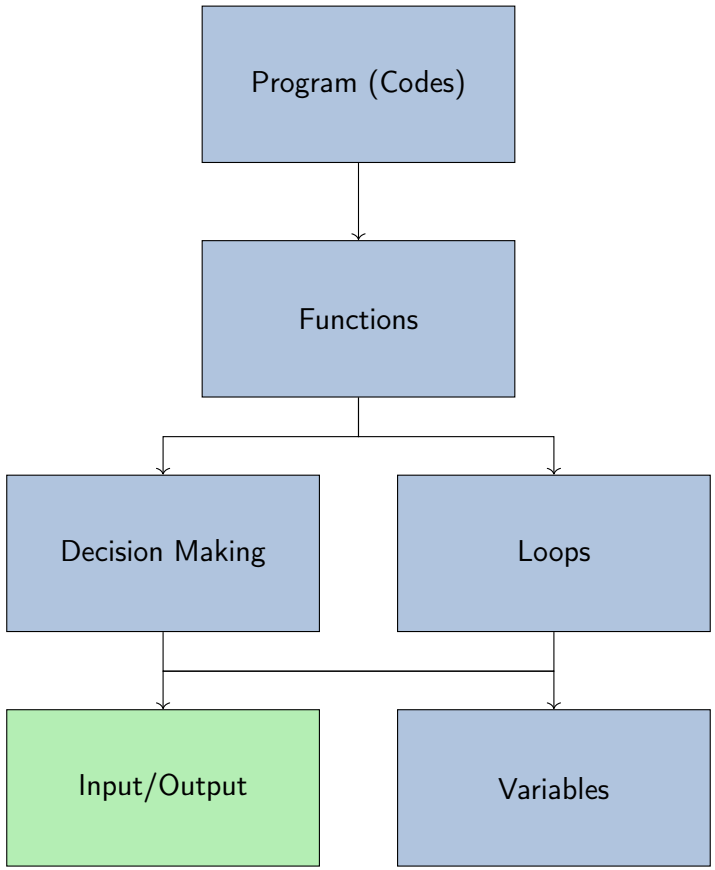


What is Python?

Did you know? Python was made by someone who was bored.
It's a language designed to be almost as understandable as English.
You will be using Python 3. Why? Because Python 1 are 2 are too old.

This is the logo of Python.

Contents


Program (Codes)
Functions
Decision Making
Loops
Input/Output
Variables

The first thing in Python - `print()` function

```
print("This is the print function.")
```

The first thing in Python - `print()` function

`print()` is a function that lets you print something,
also known as text output.

```
print("Word") # This prints the word "Word".
```

Examples:

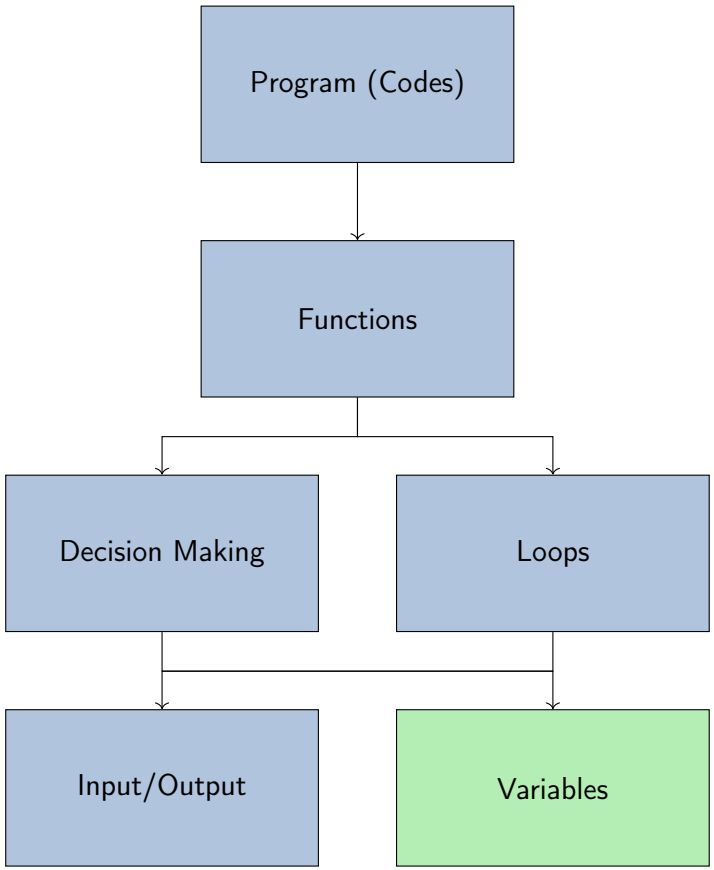
```
>>> print("Hello World")
Hello World
>>> print("Haha hehe")
Haha hehe
```

Printing multiple things

You can use a comma (,) to separate different things with a space.

```
>>> print("Alpha", "Beta", "Gamma")
Alpha Beta Gamma
>>> print("Haha", "hehe")
Haha hehe
```

Contents


Program (Codes)
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Variables

Imagine you borrow a box from the computer.

Give it a name and a value, you can now recall this value with the name!

Variables

The code usually goes:
`variable_name = data`
This means whatever `data` is, it is now stored in a variable with name `variable_name`.

Some basic variable types:

```
a = 5       # This is an integer (int) stored in a
b = True    # This is a boolean (bool) stored in b
c = 3.2     # This is a float (float)  stored in c
d = "abc"   # This is a string (str)   stored in d
e = 'abc'   # This is also a string    stored in e
```

Variables - Integers

What are integers?
Integers are just like what you've learnt in Maths, numbers without decimal points. Are the following valid?

```
a = 5         # Valid
b = 12        # Valid
c = 69420     # Valid
d = -1984     # Valid
e = 32.5      # This would become a float instead
f = '5'       # This would become a string instead
```

Variables - Integer Arithmetic Operations

You can do normal operations on integers:

```
a = 1 + 2   # a stores the integer 3
b = 80 - 52 # b stores the integer 28
c = 69 * -2 # c stores the integer -138
d = 6 / 4   # d stores the float 1.5
e = 18 / 2  # e stores the float 9.0
```

Division in Python

Whether a number can be precisely divided or not, division returns a `float`.

Variables - Integer Arithmetic Operations

Operations with variables:

```
a = 100
b = 12
c = a + b    # c stores the integer 112
d = b - a    # d stores the integer -88
e = a * -b   # e stores the integer -1200
f = a / b    # f stores the float 8.333333333333334
```

Variables - Integer Arithmetic Operations

Then how do we get an integer output?

```
a = 100
b = 12
c = a // b  # c stores the integer 8
            # // operator takes the closest and smaller
            # integer from the division operation
d = a % b   # d stores the integer 4
            # % operator takes the remainder of a
            # division operation
```

Variables - Integer Arithmetic Operations

Also, the power (exponent) operation:

```
a = 2
b = 5
c = a ** b  # c stores the integer 32
            # ** operator means power
```

Variables - Floats

What are floats?
Floats are numbers with decimal points.
Arithmetic operators we learnt can be applied as well.

```
a = 0.2      # a stores the float 0.2
b = 3.0      # b stores the float 3.0
c = a + b    # c stores the float 3.2
d = b / a    # d stores the float 15.0
e = a ** b   # e stores the float 0.008000000000000002
```

Inaccuracies

Inaccuracies happen with decimals in Python. Be careful when dealing with floats.

Variables - Floats

What happens when you combine floats and integers?

```
a = 0.2      # a stores the float 0.2
b = 3        # b stores the integer 3
c = a + b    # c stores the float 3.2
d = b / a    # d stores the float 15.0
e = a ** b   # e stores the float 0.008000000000000002
```

Arithmetic operations between `int` and `float`

Arithmetic operations between integers and floats converts the integer into a float first before operating.

Variables - Boolean values

What are boolean values?
There are only 2 boolean values in existence: `True` and `False`.

```
a = True
b = False
```

We will elaborate more on boolean values later.

Variables - Strings

What are strings?

```
a = "word"  # a stores the string "word"
b = 'word2' # b stores the string "word2"
c = '5.20'  # c stores the string "5.20"
d = 'abc"   # error
```

Quotes

In Python you must use corresponding quotation marks for strings.

Variables - Strings

How do I put the symbols ' and " into a string?
For ":

```
a = "word\"" # a stores the string "word""
b = 'word"'  # b stores the same string as a
```

Same goes for single quotes ':

```
a = 'word\'' # a stores the string "word'"
b = "word'"  # b stores the same string as a
```

Variables - Strings

There are additional symbols in strings.

```
a = "word\n" # \n represents the newline character
b = "word\t" # \t represents the tab character
```

Variables - Strings

Example:

```
a = "haha"
b = "hehe"
c = a + b     # c stores the string "hahahehe"
```

Concatenation of strings

You can concatenate (add) strings together with the addition symbol.

The End

Made in LaTeX

Last updated: 29 Mar 2024