

Python Beta 100

Python Object and Data Structures



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

Forty Hadith on the importance of Knowledge, learning and Teaching.

Hadith # 17 The Prophet's care for Students

Whenever Abu d-Darda' saw the students, he used to say:

“Greetings to the seekers of Knowledge.”

And he said: **“The messenger of Allah (peace be upon him) urged people to take good care of you. ”(ad-Darimi, Sunan)**

It has been narrated, that Abu Harun al-'Abdi and Shahr Ibn Hawshab said: Whenever we visited Abu Sa'id Al-Khudri, he used to say to us:

“Greeting to the recommendation of the Messenger of Allah.”

The Messenger of Allah peace be upon him said: **“You will conquer the land, and some people.”**

Python Objects and Data Structures

Class	Python Syntax	Description with example	Immutable
Integers	int	Whole numbers, such as 2 200 300	Yes
Floating point	float	number with a decimal point: 4.2 5.5 100.0	Yes
Strings	strin	Ordered sequence of characters: "Salam" 'Islam' "Al Nafi"	Yes
Lists	list	Ordered sequence of objects: [20, "AlNafi",104.5]	
Dictionaries	dict	unordered key: Value pairs: {"mykey" : "value" , "name" : "Muhammad"}	
Tuples	tup	ordered immutable sequence of objects: (70,"Salam",500.9)	Yes
Sets	set	unordered collection of unique objects: {"a","b","c"}	
Booleans	bool	logical value indicating True or False	Yes

Python Objects and Data Structures

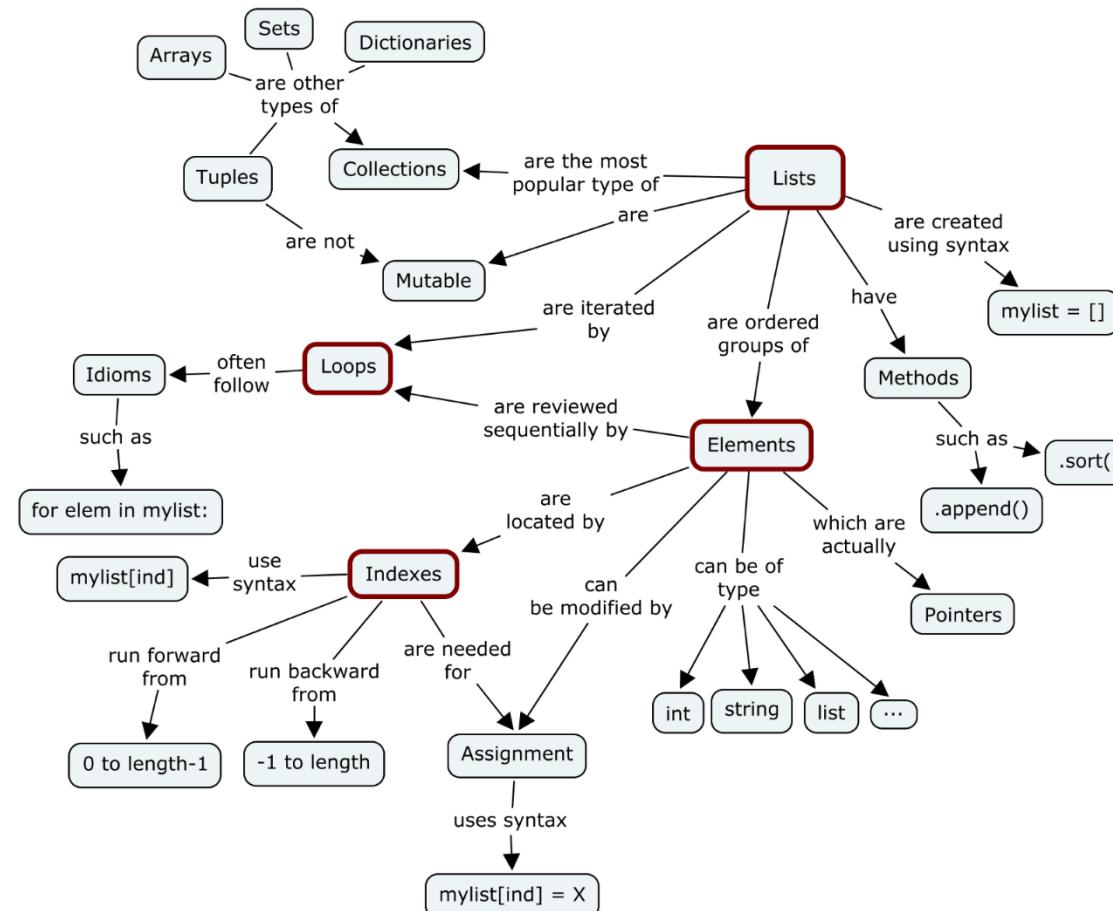
Mutable objects:

list, dict, set, byte array

Immutable objects:

int, float, complex, string, tuple, frozen set [note: immutable version of set], bytes

Deeper Dive in Python Objects!!



جزاك الله

To ask questions, please logon to the portal <https://alnafi.com/login/> and use your username and password. We will circle back to you in 2-3 business days inshAllah.

Python Beta 101

Python and Numbers



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

Forty Hadith on the importance of Knowledge, learning and Teaching.

Hadith # 20 Learning

Abu Hurairah (may Allah be pleased with him) narrated, the Messenger of Allah (peace be upon him) said:

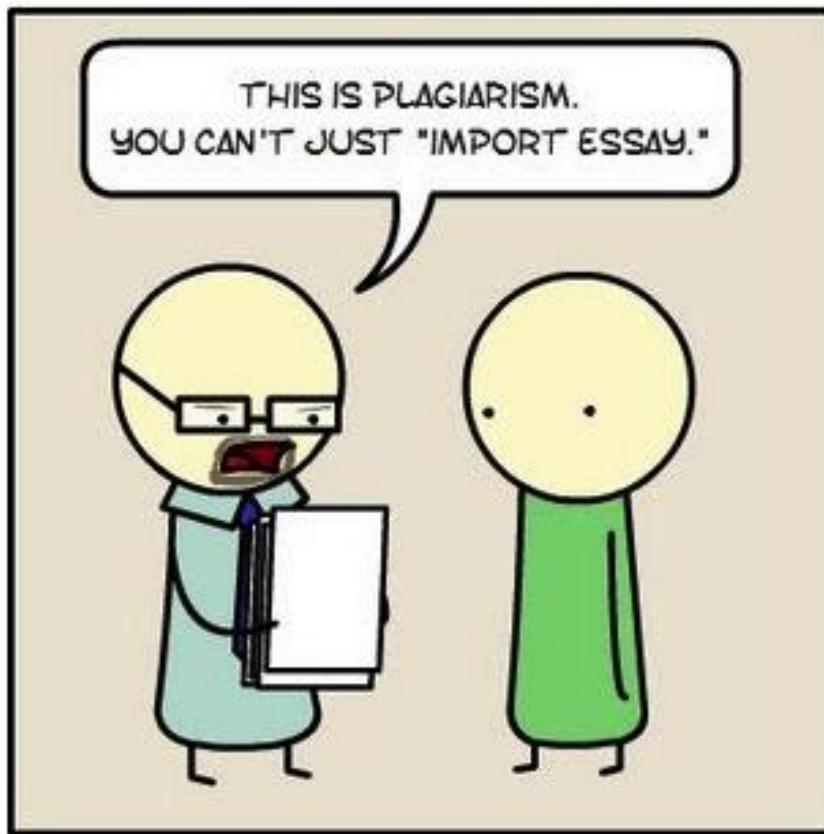
“Indeed! Acquiring knowledge is done through learning.

Indeed! Acquiring knowledge is done through learning.

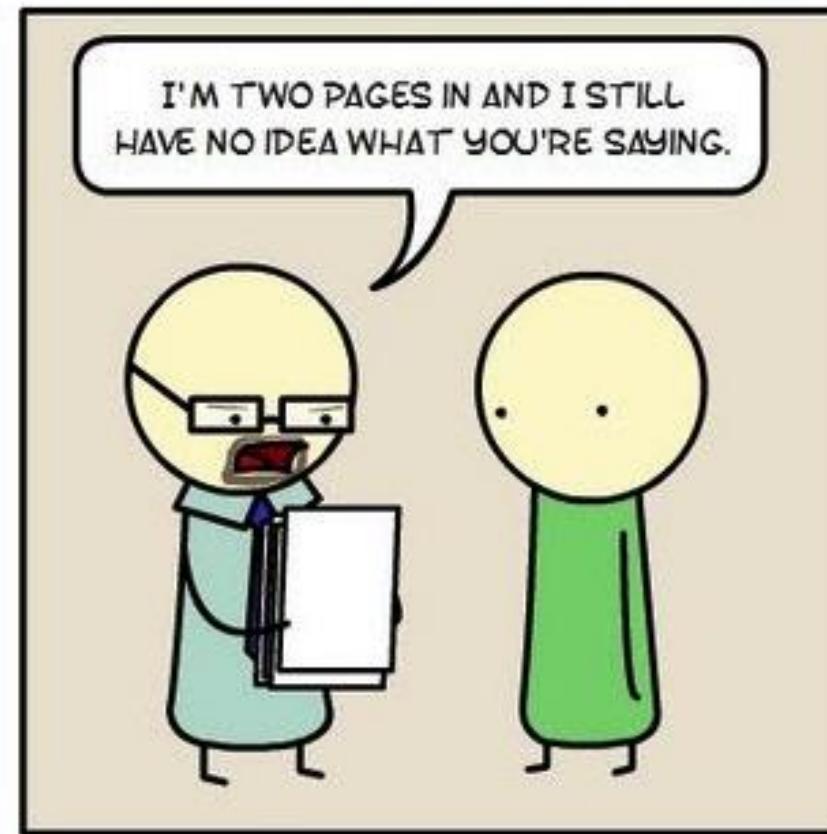
And anyone who cares about good, it will be given him, and anyone who protects himself from evil, he will be saved from it.”

(ad-Daraqutni, in al-Ifrad; al-Khatib)

Writing an essay in different languages



PYTHON



JAVA

Python and Numbers

There are two main number types in Python:

- Integers which are whole numbers.
- Numbers with decimals are known as floating point numbers.
- We will do advance math's in Python once students complete the 7 level of Math's as it relates to Data Science, ML, DL and AI at a later stage.

Assigning value to variables!!

In python we can assign values to variable names for reference purposes within our code

```
Allah_names = 99
```

Rules for variable names

- Names cannot start with a number.
- There can be no space in the name we **MUST** use _ for example
- muhammad faisal is incorrect as we can use muhammad_faisal which is correct.
- We cannot use any of these symbols
- : > < ? / “” \ !@#\$%^&~* as none of these symbols can be used when naming variables.

Best practice in Python

Best practice in Python is PEP 8

“Readability counts”

- The Zen of Python

Read the PEP 8

realpython.com/python-pep8

Rules for variable names

- Avoid using words that have special meaning in python like “list” and “str”
- Python uses Dynamic Typing which means we can reassign variables to different data types and its not a statically-Typed language.

Dynamic typing in Python

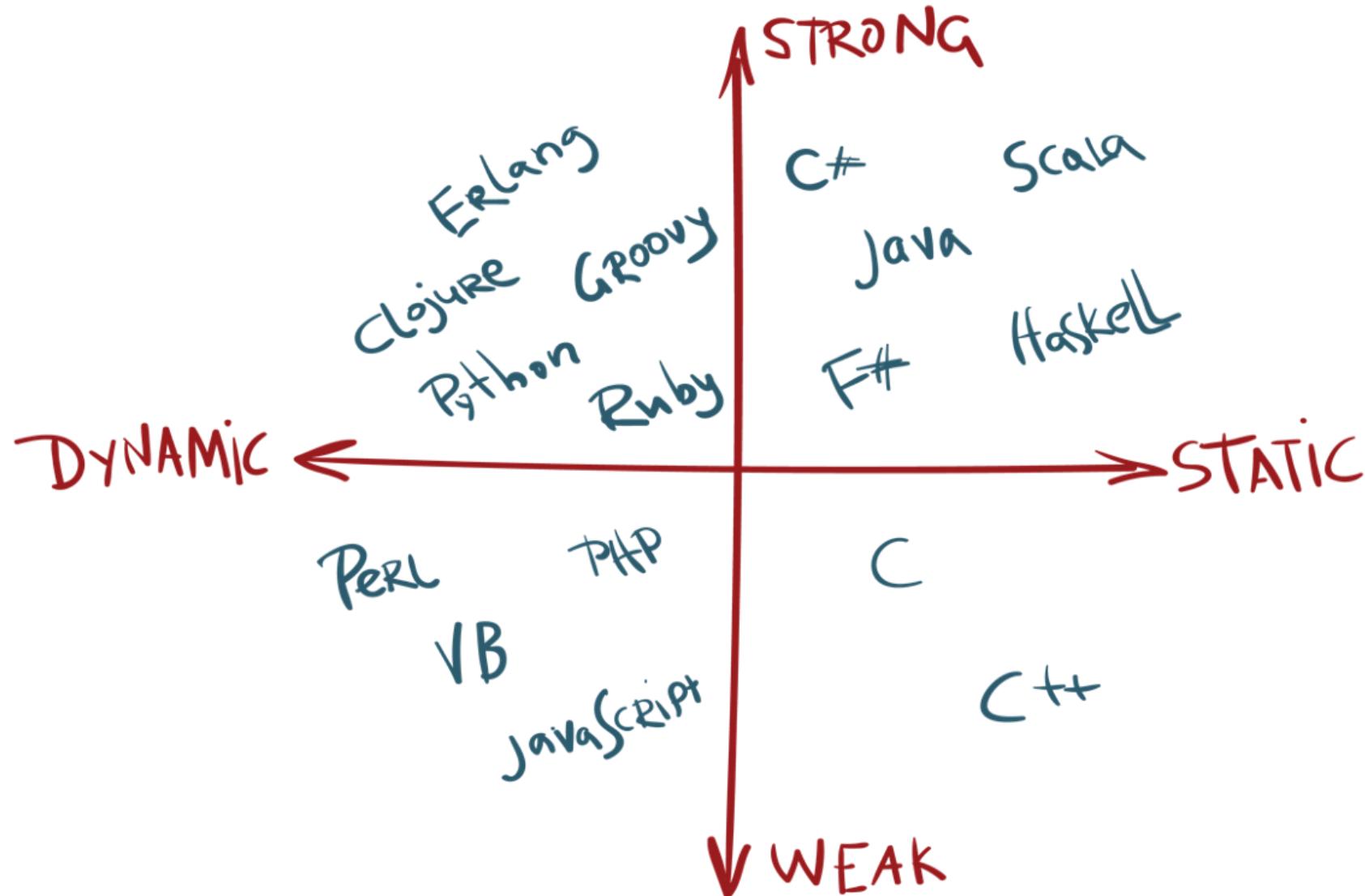
```
alnafi_portal = 1
```

```
alnafi_portal = ["cissp" , "oscp"]
```

Static typing in C++

```
int alnafi_portal = 1;
```

```
alnafi_portal = "cissp" ;
```



جزاك الله

To ask questions, please logon to the portal <https://alnafi.com/login/> and use your username and password. We will circle back to you in 2-3 business days inshAllah.

Python Beta 102

Python and Strings



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

Forty Hadith on the importance of Knowledge, learning and Teaching.

Hadith # 22 The value of Guidance

Sahl Ibn Sa'd (may Allah be pleased with him) said: The Prophet (Peace Be Upon Him) said to 'Ali (may Allah be pleased with him):

“By Allah! If Allah guides one man [to Islam] by you, it is better for you than the red camels.”

(al-Bukhari; Muslims; see an-Nawawi, Riyad as-Salihin)

```
C++ "Hello World"

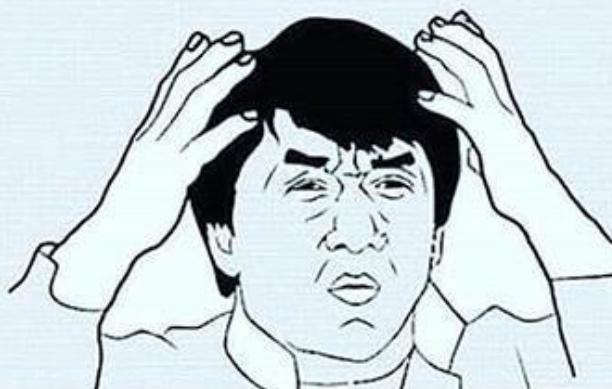
#include<iostream.h>
main()
{
cout << "Hello World";
}
return 0
```

```
JAVA "Hello World"
```

```
class HelloWorldApp
{
    public static void main(String[] args)
    {
        System.out.println("Hello World!");
    }
}
```

```
PYTHON
```

```
print "Hello World"
```



Python and Strings

Strings are sequences of characters, written either in single, or double quotes.

‘Islam is the religion of Peace’

“Islam is the religion of Peace”

Strings Slicing and Indexing

String are written in an order sequence, which means we can index them and slice them to grab a certain sub-section.

Indexing uses [] after the string (or variable assigned the string).

Indexing allows us to grab a single character from a string....

Character vs Index

- How does a Character break down to an index

Chracter	:	I	s	I	a	m
Index	:	0	1	2	3	4

Reverse Index

Character	:	I	s	I	a	m
Index	:	0	1	2	3	4
Reverse Index	:	0	-4	-3	-2	-1

Slicing in Python

- Slice allows us to grab a subsection of multiple characters, just like a slice of bread or slices of bread.

The syntax is [start:stop:step]

start is a numerical index for the slice

stop is the index we will go up to (but not include)

step is the size of the “jump” we make



جزاك الله

To ask questions, please logon to the portal <https://alnafi.com/login/> and use your username and password. We will circle back to you in 2-3 business days inshAllah.

Python Beta 102a

Python and Strings



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

Forty Hadith on the importance of Knowledge, learning and Teaching.

Hadith # 23 The seeker of Knowledge never gets satisfied

Ibn ‘Abbas (may Allah be pleased with him and his father) reported, the prophet peace be upon him said:

“Two insatiable never get satisfied:

- 1- The seeker of ‘Ilm (knowledge),
- 2- And the seeker of worldly [wealth].”

(ad-Darimi; Al-Bazzar; Ibn ‘Adi)

Slicing and Dicing in Python



Slicing in Python

- Slice allows us to grab a subsection of multiple characters, just like a slice of bread or slices of bread.

The syntax is [start:stop:step]

start is a numerical index for the slice

stop is the index we will go up to (but not include)

step is the size of the “jump” we make



Reverse Index

Character	:	I	s	I	a	m
Index	:	0	1	2	3	4
Reverse Index	:	0	-4	-3	-2	-1

جزاك الله

To ask questions, please logon to the portal <https://alnafi.com/login/> and use your username and password. We will circle back to you in 2-3 business days inshAllah.

Python Beta 102b

Python and Strings

AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.



Forty Hadith on the importance of Knowledge, learning and Teaching.

Hadith # 22 The value of Guidance

Sahl Ibn Sa'd (may Allah be pleased with him) said: The Prophet (Peace Be Upon Him) said to 'Ali (may Allah be pleased with him):

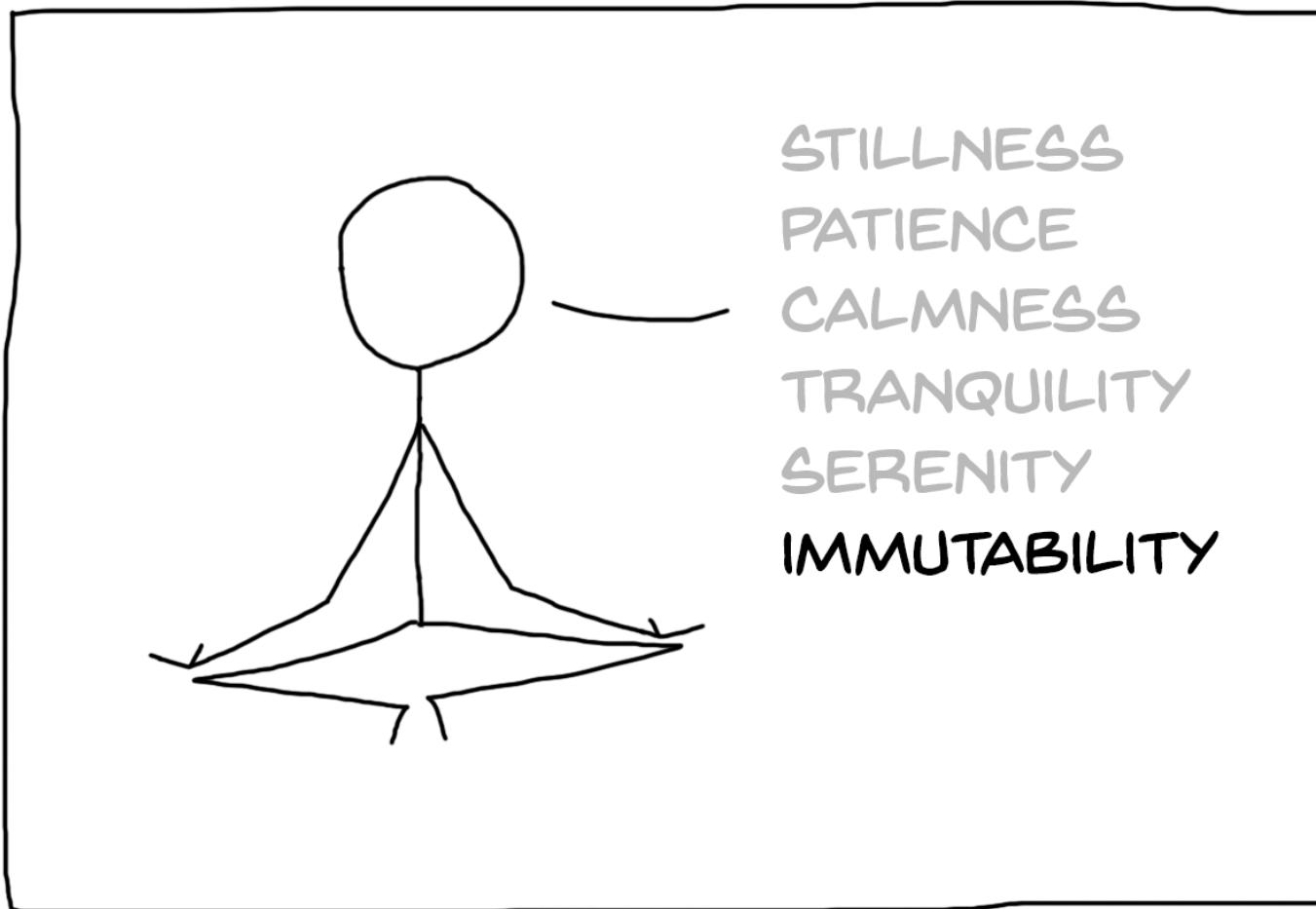
“By Allah! If Allah guides one man [to Islam] by you, it is better for you than the red camels.”

(al-Bukhari; Muslims; see an-Nawawi, Riyad as-Salihin)

Python Properties & Methods



Immutability



Python Objects and Data Structures from Python lecture 100

Class	Python Syntax	Description with example	Immutable
Integers	int	Whole numbers, such as 2 200 300	Yes
Floating point	float	number with a decimal point: 4.2 5.5 100.0	Yes
Strings	strin	Ordered sequence of characters: "Salam" 'Islam' "Al Nafi"	Yes
Lists	list	Ordered sequence of objects: [20, "AlNafi",104.5]	
Dictionaries	dict	unordered key: Value pairs: {"mykey" : "value" , "name" : "Muhammad"}	
Tuples	tup	ordered immutable sequence of objects: (70,"Salam",500.9)	Yes
Sets	set	unordered collection of unique objects: {"a","b","c"}	
Booleans	bool	logical value indicating True or False	Yes

جزاك الله

To ask questions, please logon to the portal <https://alnafi.com/login/> and use your username and password.

Python Beta 106

Python and Strings

AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.



What is Kibr?

Abdullah ibn Mas'ud reported: The Prophet, peace and blessings be upon him, said, "**No one who has the weight of a seed of arrogance in his heart will enter Paradise.**" Someone said, "But a man loves to have beautiful clothes and shoes." The Prophet said, "**Verily, Allah is beautiful and he loves beauty. Arrogance means rejecting the truth and looking down on people.**"

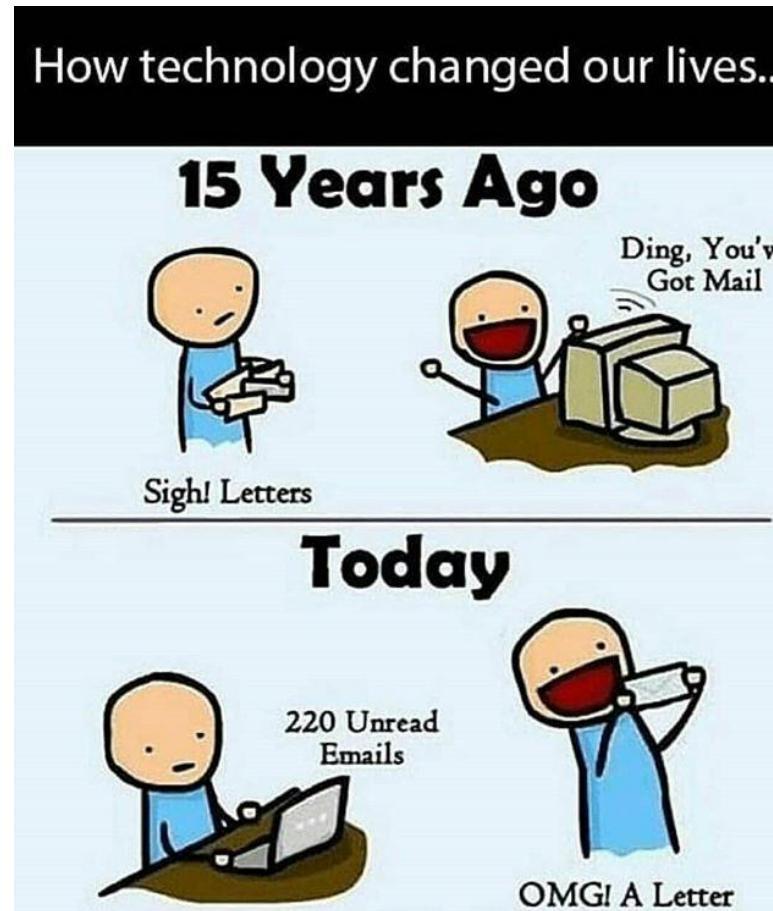
In another narration, the Prophet said, "**No one who has the weight of a seed of faith in his heart will enter Hellfire.**"

Source: *Şahīh Muslim* 91

Grade: *Sahih* (authentic) according to Muslim

عَنْ عَبْدِ اللَّهِ بْنِ مَسْعُودٍ عَنْ النَّبِيِّ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ قَالَ لَا يَدْخُلُ الْجَنَّةَ مِنْ كَانَ فِي قَلْبِهِ مِثْقَالُ ذَرَّةٍ مِنْ كِبْرٍ قَالَ رَجُلٌ يُحِبُّ أَنْ يَكُونَ ثَوْبَهُ حَسَنًا وَنَعْلَمُ حَسَنَةً قَالَ إِنَّ اللَّهَ جَمِيلٌ يُحِبُّ الْجَمَالَ الْكَبْرُ بَطْرُ الْحَقِّ وَغَمْطُ النَّاسِ
وفي رواية أخرى قال لا يدخل النار أحد في قلبه مثقال حبة خردل من إيمان
91 صحيح مسلم كتاب الإيمان بباب تحريم الكبر وبيانه

Python Print Function and Strings



Injecting a variable into a string



String Formatting methods

So what is String interpolation?

String interpolation is a process substituting values of variables into placeholders in a string.

Two methods for string interpolation

.format()

And

f-strings

Float formatting follows “{value:width.precision f}”

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)

Python Beta 107

Lists and dictionaries



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

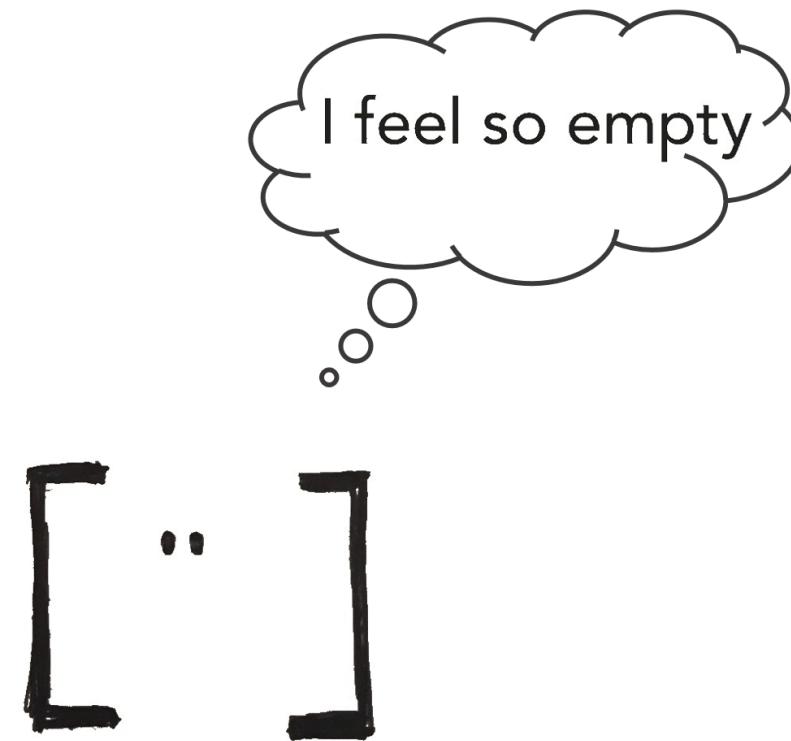
Covenant with Allah

اللَّهُمَّ فَاطِرَ السَّمَاوَاتِ وَالْأَرْضِ، عَالِمَ الْغَيْبِ وَالشَّهادَةِ،
إِنِّي أَعْهُدُ إِلَيْكَ فِي هَذِهِ الْحَيَاةِ الدُّنْيَا: إِنَّكَ إِنْ تَكِلْنِي
إِلَى نَفْسِي تُقْرِبُنِي مِنَ الشَّرِّ، وَتُبَاعِدُنِي مِنَ الْخَيْرِ،
وَإِنِّي إِنْ أَثِقُ إِلَّا بِرَحْمَتِكَ فَاجْعَلْهُ لِي عِنْدَكَ عَهْدًا
تُؤَدِّهِ إِلَيَّ يَوْمَ الْقِيَامَةِ، إِنَّكَ لَا تُخْلِفُ الْمِيعَادَ

Covenant with Allah

O Allah, Originator of the heavens and earth, Knower of the seen and unseen, I testify in this worldly life of mine that if You leave me to myself, by that You are bringing me closer to harm and distancing me from good. I have no confidence except in Your mercy, so let that be a covenant that You deliver to me on the Day of Judgment—for You never break Your promises.

A light hearted List Joke



Lists in Python

- In Python Lists are ordered sequences that can hold a variety of object types.
- We can use [] brackets and commas to separate objects in the list for example [1,2,3,4,5,6,7,8]
- Lists support indexing and slicing that we learned previously and also have a variety of useful methods that can be called on.
- Lists can also be nested that we covered in Python Alpha.

How easy is python



Dictionaries in Python

- A dictionary is a collection which is unordered, changeable and indexed. In Python dictionaries are written with curly brackets, and they have keys and values.
- Dictionaries use a key-value pairing instead
`{'key1':'value1','key2':'value2'}`
- The key value pair allows users to grab objects without needing to know an index location

Dictionary vs lists

- Dictionaries: Objects retrieved by key name.

They are unordered and cannot be sorted.

- Lists: objects retrieved by location.

Ordered sequence can be indexed or sliced.

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)

Python Beta 108

Tuples, sets and Booleans in Python



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

The Enormity of My Sins vs. Allah Mercy

يَا رَبِّ إِنَّ ذُنُوبِي عَظِيمَةٌ، وَإِنَّ قَلِيلًا عَفْوِكَ أَعْظَمُ مِنْهَا،
اللَّهُمَّ فَامْحُ بِقَلِيلٍ عَفْوِكَ عَظِيمٌ ذُنُوبِي

*Ya rabbi inna dhunūbī ‘azimatun, wa-inna qalīla
‘afwika a‘zamu minhā, allāhumma famhu bi-qalīli
‘afwika ‘azīma dhunūbī*

***My Lord, my sins are enormous, but a little
of Your forgiveness is greater than all of them.
O Allah, so erase with a little of Your forgiveness
the enormity of my sins.***

A light hearted joke

A journalist asked a programmer:- what makes a code bad?

No Comment

Tuples in Python

- Tuples are similar to lists. However lists are mutable and tuples are not i.e. immutable
- List can be changed tuples cannot be changed.
- Tuples are sequences just like lists.
- Elements inside tuple cannot be reassigned
- We use parenthesis ()
- The empty tuple is written as two parentheses containing nothing
- Like string index's, tuple index's start at 0, and they can be sliced, concatenated, and so on.

Sets in Python

- Sets are unordered and unindexed collection of unique elements.
- Meaning there can only be one representative of the same object.

Booleans in Python

- Boolean values define two constant objects which can be either True or False
- This logic is key to control flow and other use cases.

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)

Python Beta 109

Input and Output in Python

AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

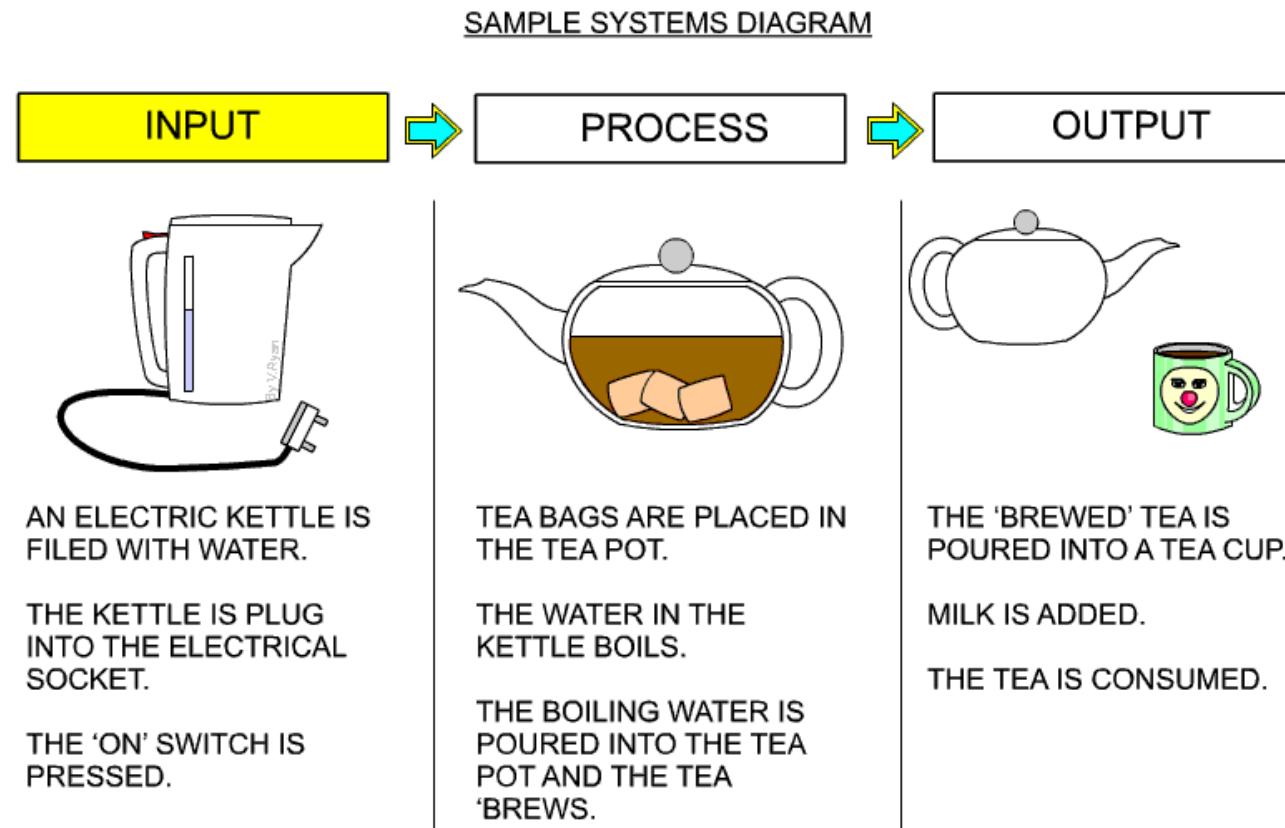


The Hand That Kills Me

اللَّهُمَّ ارْزُقْنِي شَهَادَةً فِي سَبِيلِكَ وَاجْعَلْ مَوْتِي فِي بَلَدِ
رَسُولِكَ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ. اللَّهُمَّ لَا تَجْعَلْ قَتْلِي عَلَى
يَدِ عَبْدٍ سَجَدَ لَكَ سَجْدَةً يَحْاجِنِي بِهَا يَوْمَ الْقِيَامَةِ.

O Allah, I ask You, to be accepted as a martyr in the city of your Prophet (peace and blessings of Allah be upon him). O Allah, do not let my killing be at the hand of someone who ever prostrated to You, lest he use that against me on the Day of Judgement.

A light hearted joke



Input and Output in Python

- There are several ways to present the output of a program; data can be printed in a human-readable form, or written to a file for future use. The same applies to video files, word files, and or any kind of files to be used at a later stage with respect to ML, DL, AI and DS.

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)

Python Beta 110

Python Boolean Operators



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

The Highest Companionship

اللَّهُمَّ إِنِّي أَسْأَلُكَ إِيمَانًا لَا يَرْتَدُ ، وَنِعِيمًا لَا يَنْفَدُ ،
وَمُرَافَقَةً نَبِيًّا مُحَمَّدًا صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ
فِي أَعْلَى جَنَّةِ الْخُلُدِ

O Allah, I ask You for faith that does not unravel, and delight that never depletes, and the companionship of Your Prophet Muhammad (peace and blessings of Allah be upon him) in the highest eternal garden.

Python Operators

Operator	Meaning
<code>==</code>	Equal to
<code>!=</code>	Not equal to
<code><</code>	Less than
<code>></code>	Greater than
<code><=</code>	Less than or equal to
<code>>=</code>	Greater than or equal to

Logical Boolean Operators

Python Logical Operators Example

Operator	Description
and Logical AND	If both the operands are true then condition becomes true.
or Logical OR	If any of the two operands are non-zero then condition becomes true.
not Logical NOT	Used to reverse the logical state of its operand.

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)

Python Beta 120

if, elif and else

AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.



The Precious Prayer of a Mother

اللَّهُمَّ ارْحَمْ طُولَ ذَلِكَ الْقِيَامِ فِي اللَّيْلِ الطَّوِيلِ،
وَذَلِكَ التَّحِيْبُ وَالظَّمَاً فِي هَوَاجِرِ الْمَدِيْنَةِ وَمَكَّةَ،
وَبِرَّهُ بِأَبِيهِ وَبِي. اللَّهُمَّ قَدْ سَلَّمْتُهُ لِأَمْرِكَ فِيهِ،
وَرَضِيْتُ بِمَا قَضَيْتَ فَأَثِيْنِي فِي عَبْدِ اللَّهِ
ثَوَابَ الصَّابِرِيْنَ الشَّاكِرِيْنَ

O Allah, have mercy on his lengthy standing during the longest nights, and that whimpering, and his thirst during the hot summer days of Makkah and Madinah (all of those days that he starved, all of those days that he suffered, all of those days that he was abandoned and all of those days that he stood up, calling upon You during the longest night), and reward his kindness to his father and to me. O Allah, I have surrendered him to whatever You decree on him, and I have made myself content with whatever You have decided for him. So grant me the reward of the patient and the thankful.

If and Else in Python

The **if..else** statement evaluates test expression and will execute body of **if** only when test condition is True . **If** the condition is False , body of **else** is executed. Indentation is used to separate the blocks.

The key statements are

if

elif

else

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)

Python Beta 130

loops in python



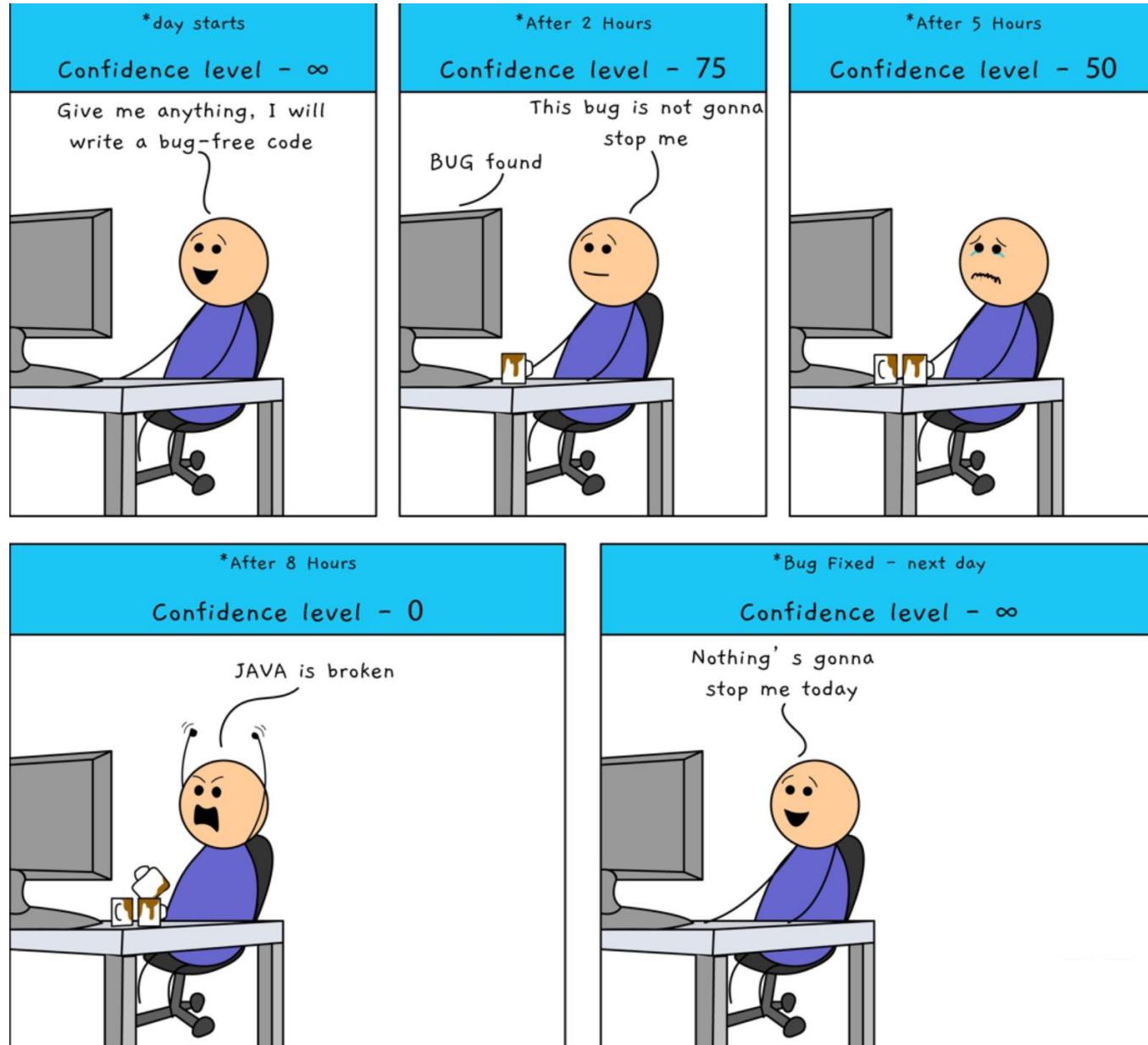
AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

© 2018 Al-Nafi. All Rights Reserved.

The Greed of the Soul

اللَّهُمَّ قِنِي شُحًّا نَفْسِي

O Allah, protect me from the greed of my soul!



Loops in Python

Python For Loops. A **for loop** is used for **iterating** over a sequence (that is either a list, a tuple, a dictionary, a set, or a string). This is less like the **for** keyword in other programming languages, and works more like an iterator method as found in other object-orientated programming languages.

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)

Python Beta 150 more loops in python continued!



AL NAFI,
A company with a focus on education,
wellbeing and renewable energy.

Don't Punish a Tongue of Praise

إِلَهِي لَا تُعَذِّبْ لِسَانًا يُخْبِرُ عَنْكَ، وَلَا عَيْنًا تَنْظُرُ إِلَى
عُلُومٍ تَدْلُّ عَلَيْكَ، وَلَا يَدًا تَكْتُبُ حَدِيثَ رَسُولِكَ؛
فَبِعِزَّتِكَ لَا تُذْخِلنِي النَّارَ

My God, do not punish a tongue that informs about You, nor an eye that looks upon (Islamic) sciences which point to You, nor a hand that writes the Traditions of Your Messenger. So by Your honour, do not admit me into the Fire.

Reference Suleiman Omar.

More Loops in Python continued!!

A **while loop statement in Python** programming language repeatedly executes a target **statement** as long as a given condition is true.

جزاك الله

To ask questions, Join the Al Nafi Official Group

<https://www.facebook.com/groups/alnafi/>

(This group is only for members to ask questions)