

Computer Programming





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جمهوری اسلامی ایران

علوم تحقیقات و فناوری



جمهوری اسلامی ایران

وزارت علوم، تحقیقات و فناوری

برنامه درسی

مقاطعه کارشناسی

علوم و مهندسی آب
(بازنگری شده)



مهندسی کشاورزی و منابع طبیعی

مینیمه علوم و مهندسی آب

پیش‌تینی جلسه شورای برنامه‌ریزی آموزش عالی

وزارت علوم، تحقیقات و فناوری مورخ ۹۱/۱۱/۸

R2018b (9.5.0.944444)
64-bit (win64)
August 28, 2018
License Number: 968398

عنوان درس به فارسی:
برنامه‌نویسی رایانه‌ای
عنوان درس به انگلیسی:
Computer programming

نعداد واحد	نوع	رایه	دروس بیشتر	۲ واحد نظری
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هدف درس:
کسب دانش و مهارت لازم برای تکمیل آموزش

سرفصل یا رئوس مطالب:
نظری:
مقدمه و تاریخچه مختصر رایانه، ابزارهای نرم افزاری و طبقهبندی ساختهای اساسی برنامه سازی تصمیم‌گیری، مفهوم پارگشته - شناسانه (کاراکتری) - آرایه‌ها و رکورد و ماده ورودی/خروجی - مفاهیم فوق به تکمیل آن را در زبان رایانه‌ای دیگر بیان می‌نماییم.

عملی:
کامپیوچرها برای استفاده از زبانهای کد برنامه‌نویسی و گزینه‌های مورد استفاده قرار گیرند. بروزرسانی های مرتبط با هر بخش و بروزرسانی های مرتبط با هر بخش MATLAB در حل مسئله روش ارزیابی (درصد):

ارزشیابی مستمر	او
----------------	----

منابع اصلی:

- جعفریزاد، فیض، (۱۳۸۱). برنامه نویسی
- چاپن، ا. (۱۳۸۷). برنامه نویسی
- تلبران، م. (۱۳۸۷). برنامه نویسی در فریون
- مشعل، م. برنامه نویسی در فریون

Footnotes:
1. Chapman, S.J. (۱۹۹۰) Fortran ۹۵, ۹۰% for scientists and engineers, ۷th ed., McGraw-Hill
5. Hahn, B. and Valentine, D. (۱۹۹۴) Essential Matlab for engineers and scientist, Elservier.

References





Your Knowledge of Programming

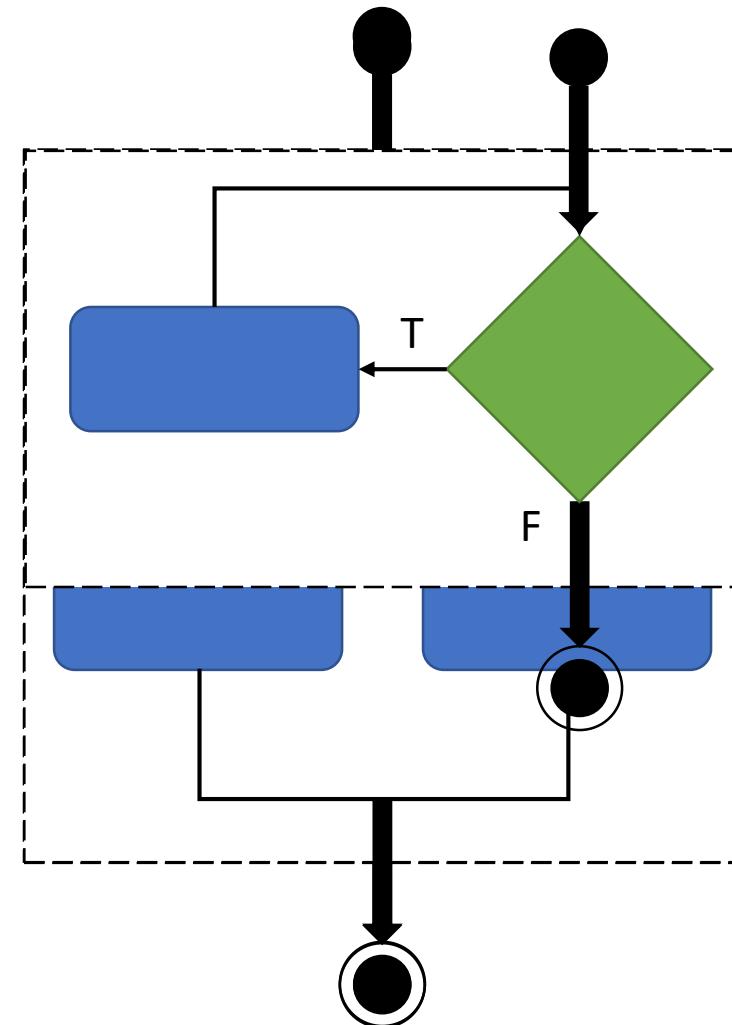


Basic Control Structures

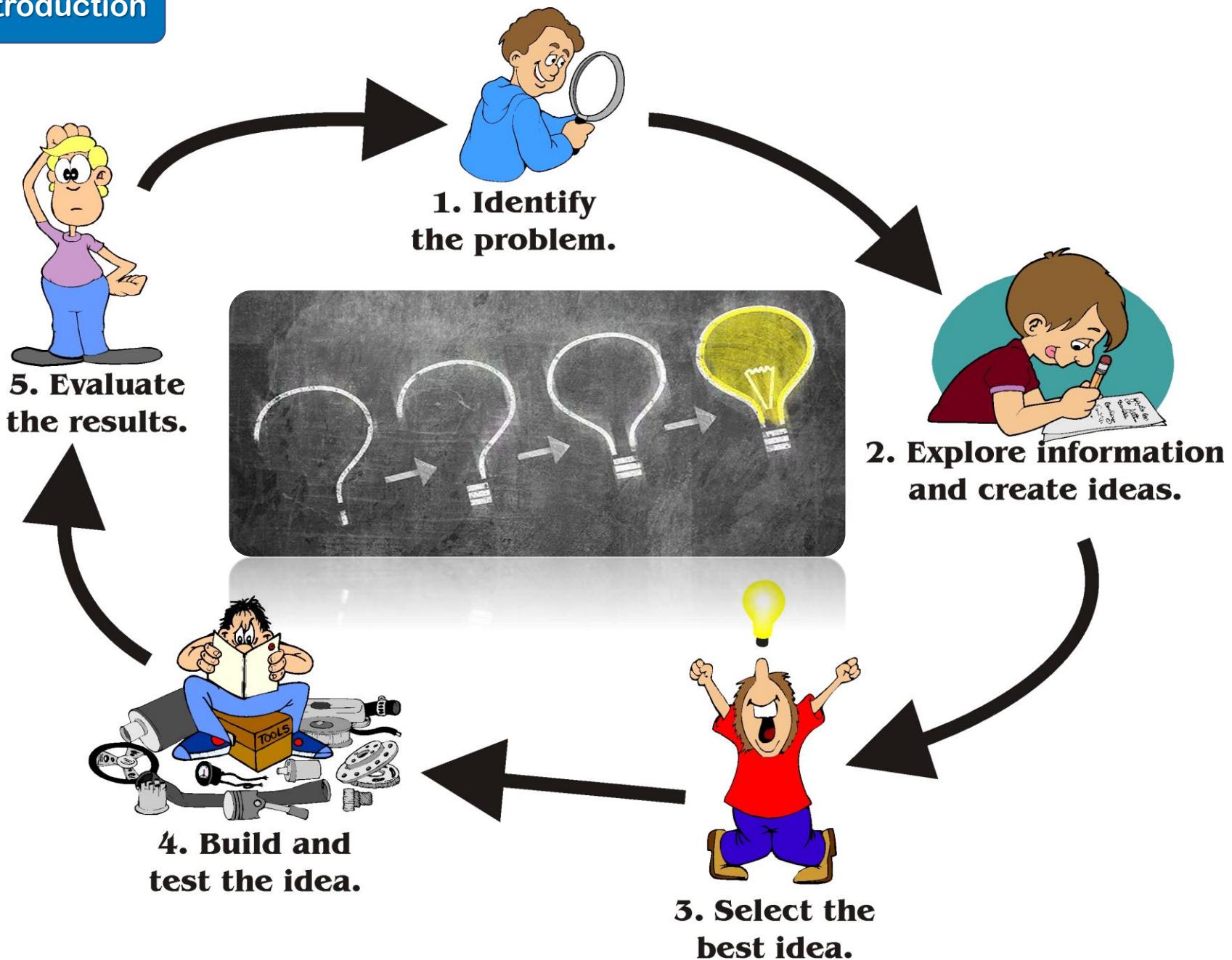
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Selection

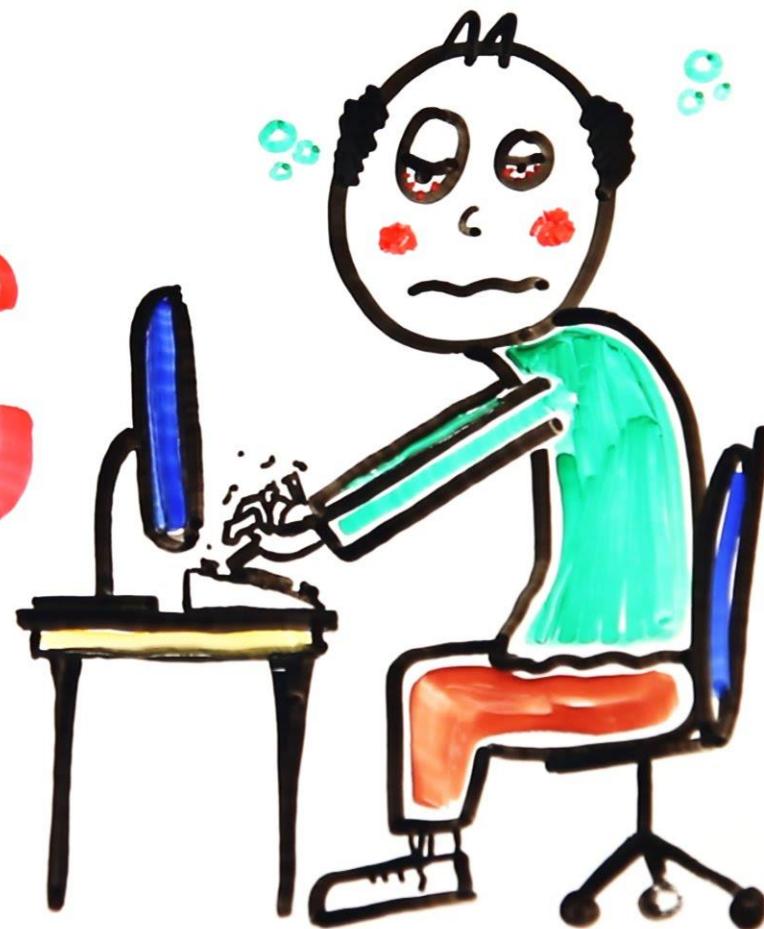
Iteration



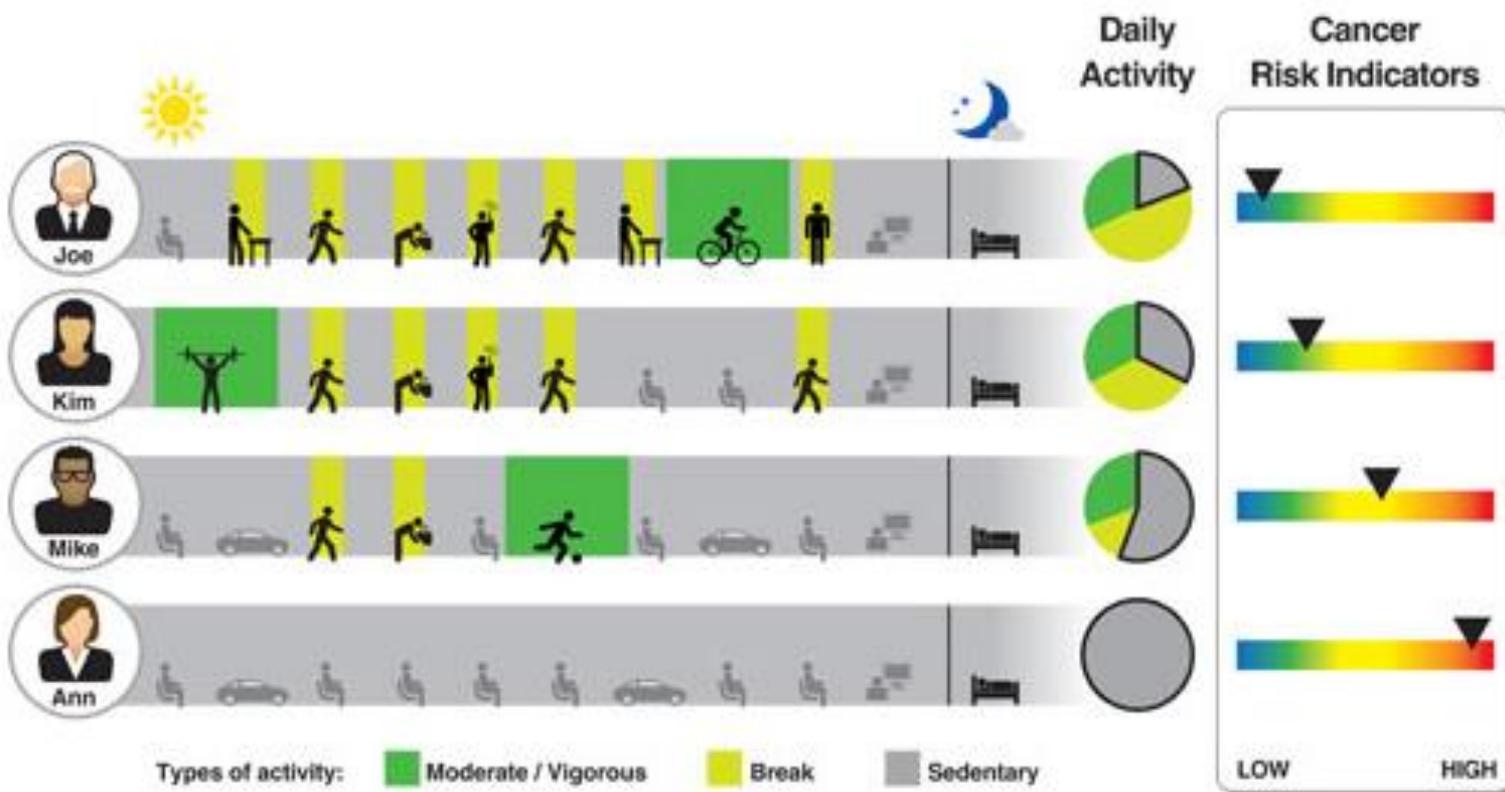
Introduction



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SITTING
Too MUCH?



Example



Example

PURPOSE





What Should Be Done?

- Step 01: First ...
- Step 02: Next ...
- Step 03: Then ...

Example



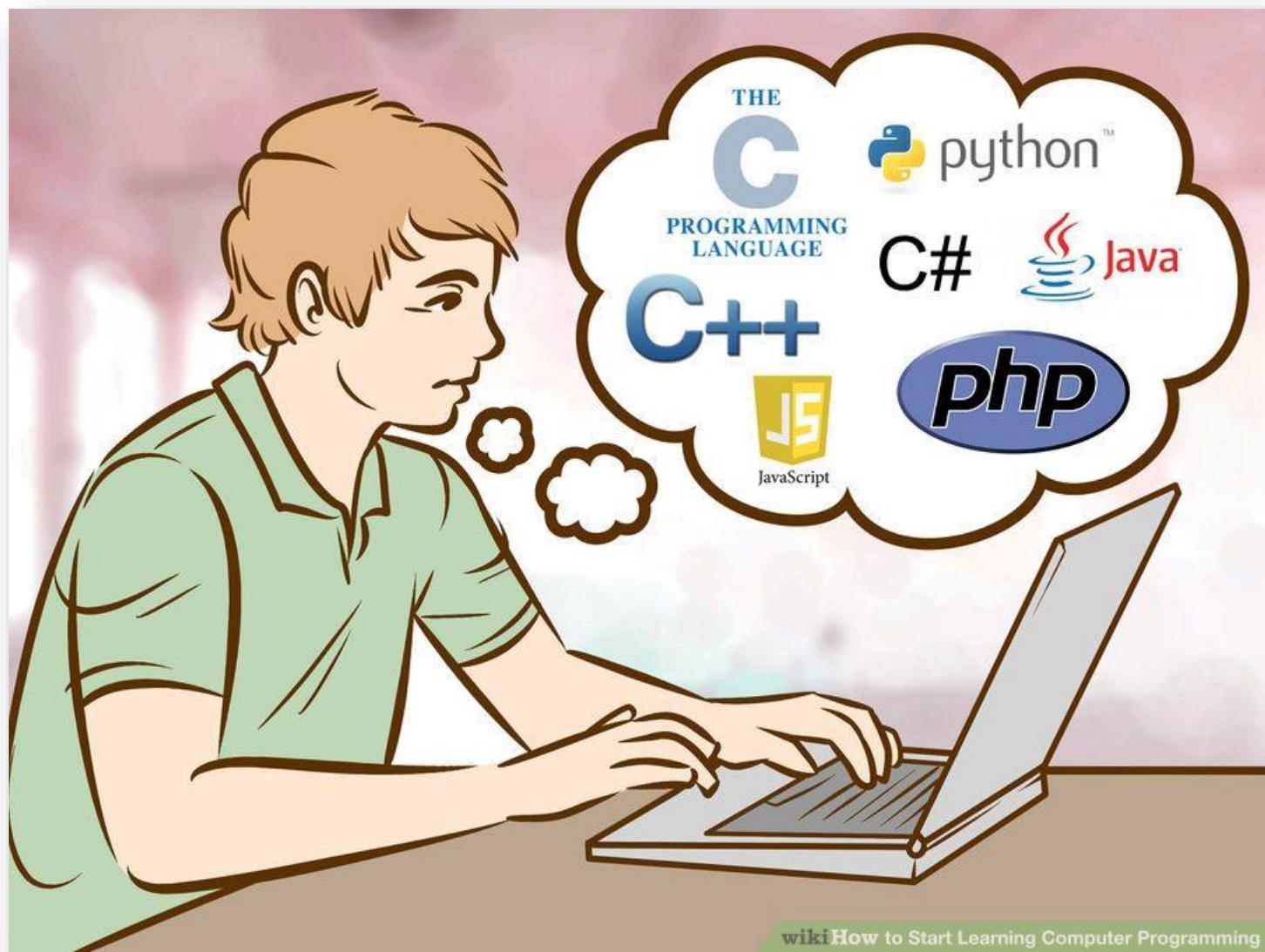
Repeat This Step Two Times:



- Step 01: Waiting for 2 Hours

- Step 02: Show Me a Clip

Example



Example



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Easiest Programming Language to Learn

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Easiest Programming Language to Learn

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JavaScript is a primarily a client side-scripting language used for front-end development. **Java** is easy to learn but not as compared to **Python** and **Ruby** on Rails. its syntax is quite similar to C because of its cross-platform nature. It is also one of the easy and popular programming languages to learn.

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Top 5 Programming Languages for Beginners - CoderDojo
<https://coderdojo.com/2015/03/20/top-5-programming-languages-for-beginners/> ▾

Mar 20, 2015 - Top 5 Programming Languages for Beginners. **JavaScript**. **JavaScript** is another language which is in high demand at the moment, but it is not to be confused with **Java**. Learn **JavaScript** here. **Python**. **Python** is one of the most widely-used high-level programming languages. Learn **Python** here. **Ruby**. Learn **Ruby** here. **Java** ...

What Programming Language Should a Beginner Learn in 2018 ...
<https://www.codementor.io/codementorteam/beginner-programming-language-job-sal...> ▾

Jan 23, 2017 - PHP is a server-side scripting language and is usually considered beginner-friendly. It's easy to conceptualize what the PHP code will do, ...

An Overview of ... · Job Opportunities · Programming Resources

Which is the easiest programming language to learn? - Silicon Republic
<https://www.siliconrepublic.com/advice/programming-language-skills-javascript.html> ▾

Jul 27, 2017 - Want to know which programming language is the easiest to learn? Check out what experienced programmers had to say.

What is the easiest programming language to learn for a beginner ...
<https://www.quora.com/What-is-the-easiest-programming-language-to-learn-for-a-begin...>

Feb 19, 2018 - **JavaScript** is a primarily a client side-scripting language used for front-end

Example



python - Google Search

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The official home of the Python Programming Language.

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Python 3.5.6 - Python 2.7.15

Python For Beginners
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Python 3.7.0 released
Python 3.7.0 is the newest major release of the Python ...

The Python Tutorial
1. Whetting Your Appetite - 5. Data Structures - 9. Classes - ...

Python Docs
Python 3.7.1rc1 documentation.
Welcome! This is the ...

About
Applications for Python - Python For Beginners - Quotes - Help

Python (programming language) - Wikipedia
[https://en.wikipedia.org/wiki/Python_\(programming_language\)](https://en.wikipedia.org/wiki/Python_(programming_language)) ▾
Python is an interpreted high-level programming language for general-purpose programming. Created by Guido van Rossum and first released in 1991, Python ...
Developer: Python Software Foundation Typing discipline: Duck, dynamic, strong since ...
Designed by: Guido van Rossum Paradigm: Object-oriented, imperative, functional, procedural, reflective
History: Features and philosophy · Syntax and semantics · Implementations

Python Tutorial: Learn Python For Free | Codecademy
<https://www.codecademy.com/learn/learn-python> ▾
In 10 hours, learn the basics of the world's fastest growing and most popular programming language used by software engineers, analysts, data scientists, and machine learning engineers alike. ... Finish this course, and you'll have learned basic Python. ... Python Syntax.

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Feedback

Python High-level programming language

Python is an interpreted high-level programming language for general-purpose programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. [Wikipedia](#)

Typing discipline: Duck, dynamic, strong since version 3.5: Gradual
Designed by: Guido van Rossum
Stable release: 3.7.0 / 27 June 2018; 3 months ago; 2.7.15 / 1 May 2018; 4 months ago
Paradigm: Object-oriented, imperative, functional, procedural, reflective
Filename extensions: .py, .pyc, .pyd, .pyo (prior to 3.5), .pyw, .pyz (since 3.5)
Parent company: Python Software Foundation

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Example

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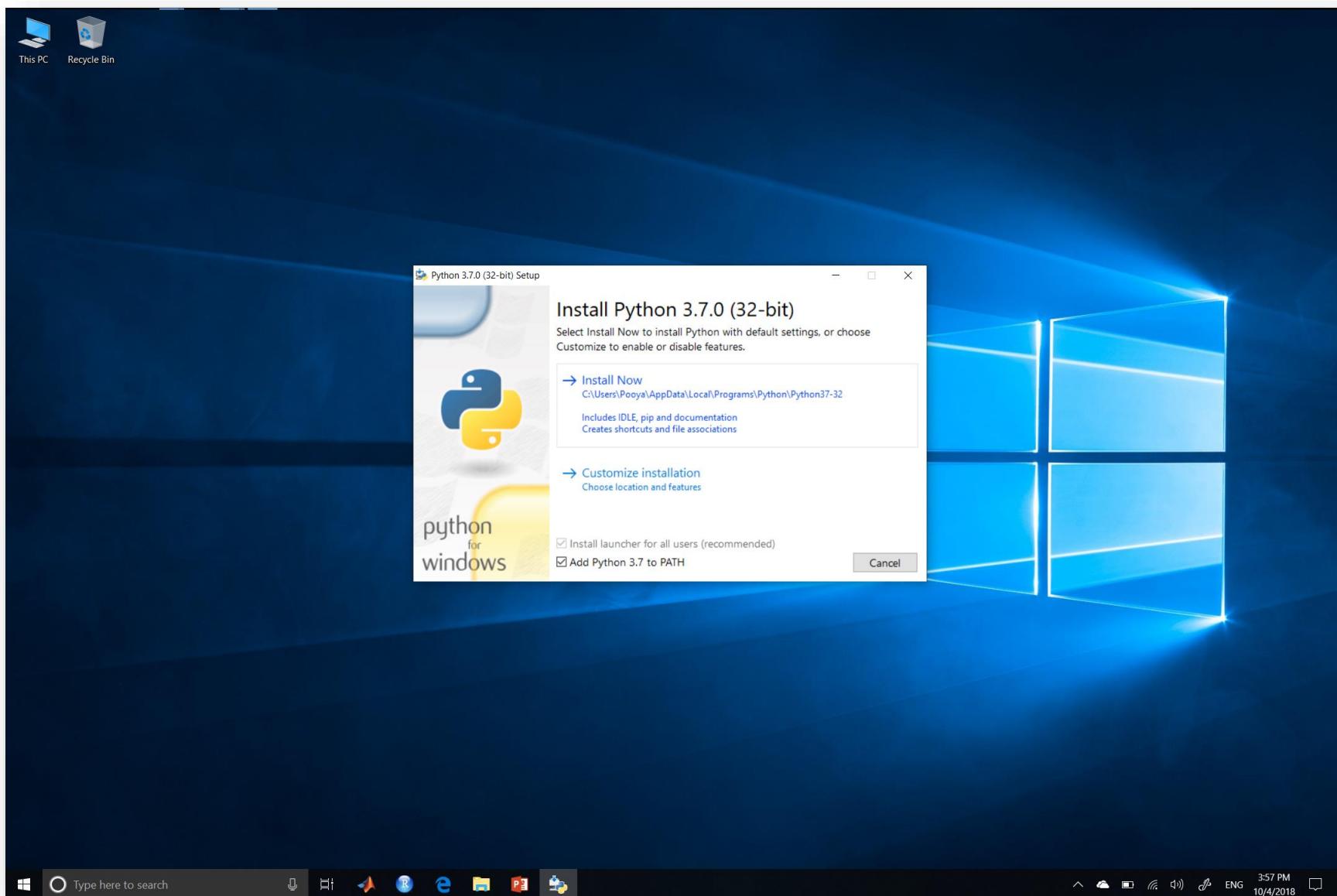
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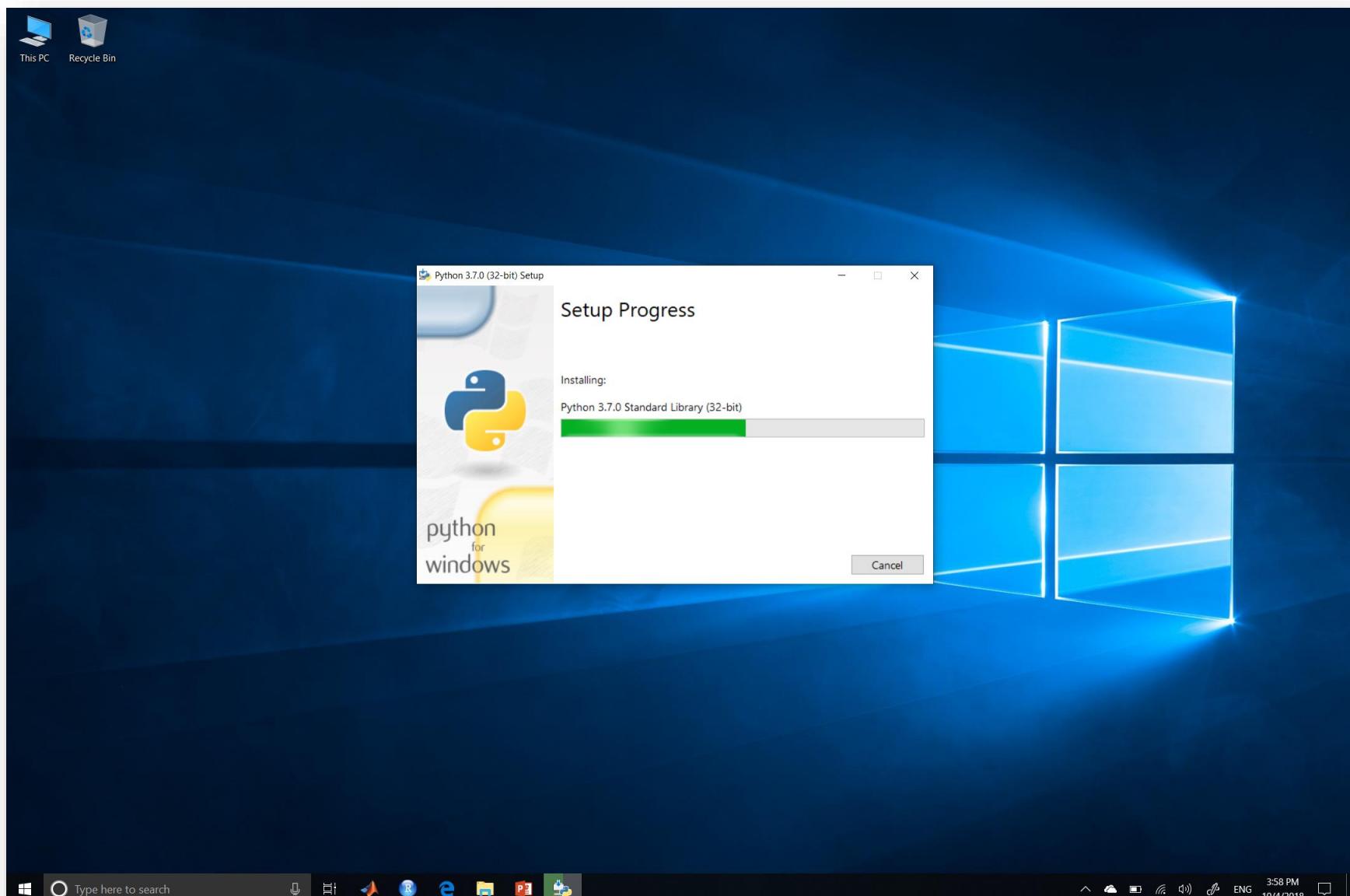
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Python 3.4.9	2018-08-02	Download Release Notes
Python 3.7.0	2018-06-27	Download Release Notes
Python 3.6.6	2018-06-27	Download Release Notes
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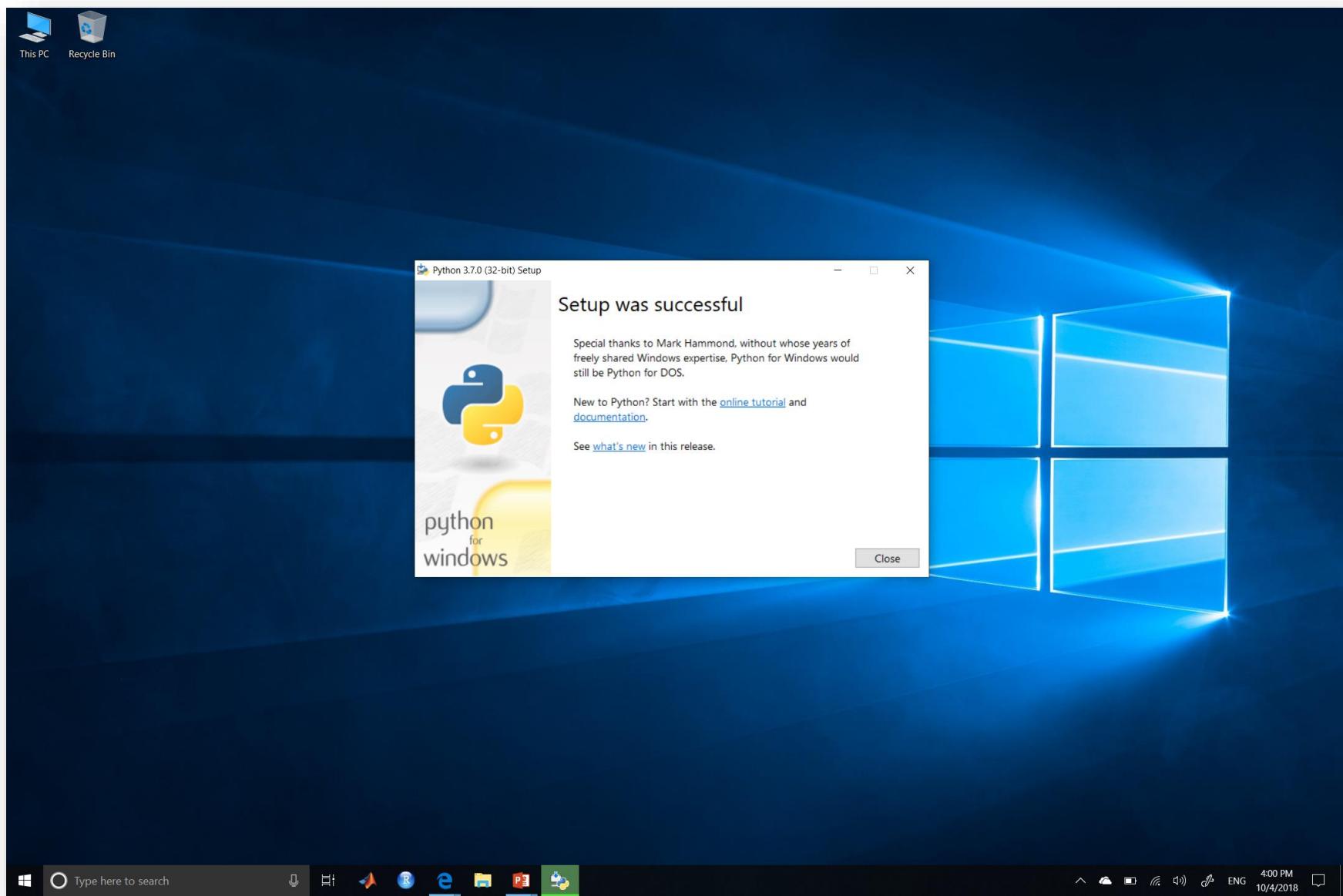
Example



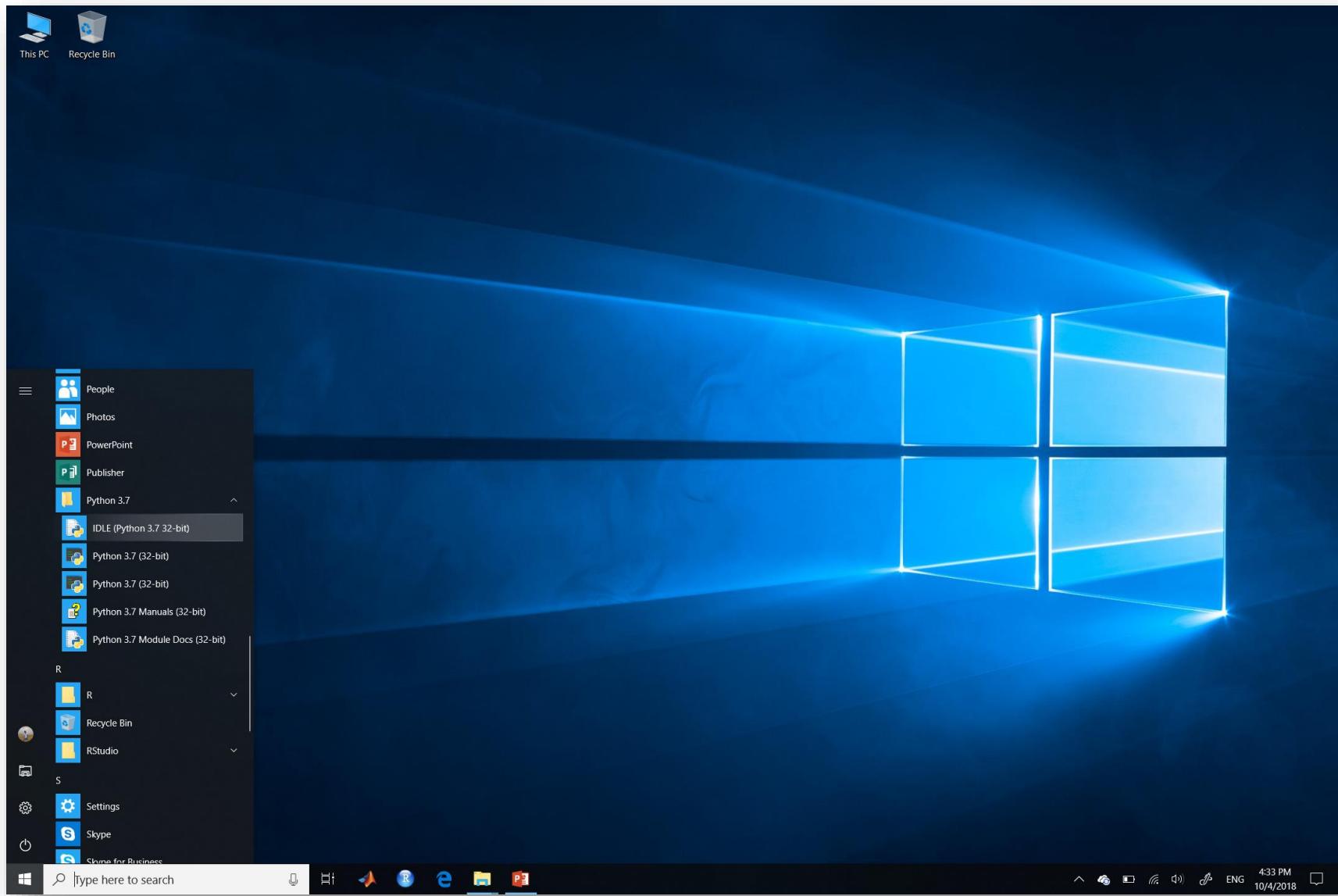
Example



Example



Example



Example



```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
```

The screenshot shows a Windows desktop environment. In the center is a Python 3.7.0 Shell window titled "Python 3.7.0 Shell". The menu bar includes File, Edit, Shell, Debug, Options, Window, and Help. Below the menu, it displays the Python version and build details. The command prompt shows ">>>". The taskbar at the bottom has several pinned icons: File Explorer, Edge browser, FileZilla, Microsoft Word, Microsoft Excel, and Microsoft Powerpoint. The system tray shows battery status, signal strength, and other system icons. The status bar at the bottom right indicates the time as 4:33 PM, date as 10/4/2018, and language as ENG.

Example



Python 3.7.0 Shell

File Edit Shell Debug Options Window Help

New File Ctrl+N 9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)] on win32
ts" or "license()" for more information.

Open... Ctrl+O
Open Module... Alt+M
Recent Files
Module Browser Alt+C
Path Browser

Save Ctrl+S
Save As... Ctrl+Shift+S
Save Copy As... Alt+Shift+S

Print Window Ctrl+P

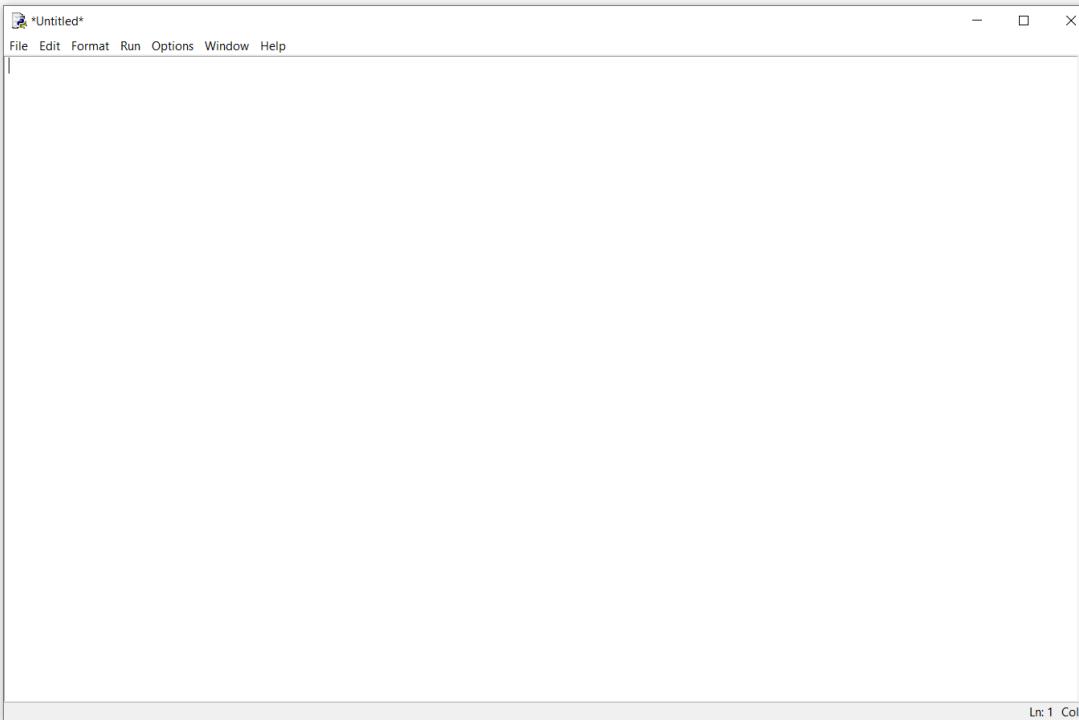
Close Alt+F4
Exit Ctrl+Q

Ln: 3 Col: 4

Example



```
Python 3.7.0 Shell
File Edit Shell Debug Options Window Help
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>


Ln: 1 Col: 0
```

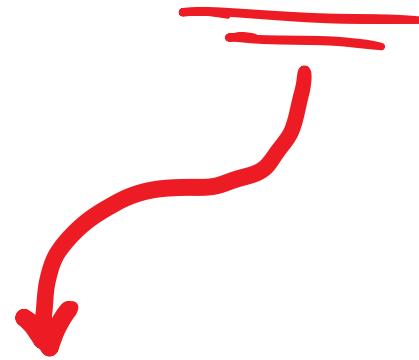
Example



Repeat Two Times:

- Wait Two Hours
- Open A File

How to Open a File or
Program in Python



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How to run Python programs?

Mac[edit]

1. Create a folder on your computer to use for your Python programs. ...
2. Open the Applications folder, go into the Utilities folder, and open the Terminal program.
3. Type cd pythonpractice to change directory to your pythonpractice folder, and hit Enter.
4. Type python ./hello.py to run your program!

Python Programming/Creating Python Programs - Wikibooks, open ...
https://en.wikibooks.org/wiki/Python_Programming/Creating_Python_Programs

Search for: How to run Python programs?

About this result • Feedback

Python 101: How to Open a File or Program | The Mouse Vs. The Python
<https://www.blog.pythonlyibrary.org/.../python-101-how-to-open-a-file-or-program/>

Sep 4, 2010 - When I began learning Python, one of the first things I needed to know how to do was **open a file**. Now, the term "**open a file**" can mean different ...
You've visited this page 4 times. Last visit: 1/31/17

How can I open files in external programs in Python? - Stack Overflow
<https://stackoverflow.com/questions/.../how-can-i-open-files-in-external-programs-in-python>

Feb 24, 2013 - This question already has an answer here: **Open** document with ... On Windows you could use os.startfile() to **open** a file using default application:

windows - How to open a file in its default program with python - Stack ...
<https://stackoverflow.com/questions/.../how-to-open-a-file-in-its-default-program-with-pytho...>

Example



Python 101: How to Open a File or Program

① September 4, 2010 Cross-Platform, Python files, I/O, Python 101, subprocess Mike

When I began learning Python, one of the first things I needed to know how to do was open a file. Now, the term “open a file” can mean different things depending on the context. Sometimes it means to actually open the file with Python and read from it, like with a text file. Other times, it means “to open the file in its default program”; and sometimes it means, “open the file in the program I specify”. So, when you go looking for how to do the latter two, you need to know how to ask Google just the right question or all you’ll end up with is learning how to open and read a text file.

In this article, we’re going to cover all three and we’ll also show how to open (or run)

wxPython Cookbook



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Example



How to Open a File or Program Python 101: How to Open a File or Program

https://www.blog.pythonlibrary.org/2010/09/04/python-101-how-to-open-a-file-or-program/

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Open a file with its own program

Python has a simple method for opening a file with its default program. It goes something like this:

```
import os
os.startfile(path)
```

Yes, it's that easy, if you're on Windows. If you're on Unix or Mac, you'll need the subprocess module or "os.system". Of course, if you're a real geek, then you probably have multiple programs that you might want to use to open a specific file. For example, I might want to edit my JPEG file with Picasa, Paint Shop Pro, Lightroom, Paint.NET or a plethora of other programs, but I don't want to change my default JPEG editing program. How do we solve this with Python? We use Python's subprocess module! *Note: If you want to go old school, you can also use os.popen* or os.system, but subprocess is supposed to supersede them.*

```
import subprocess

pdf = "path/to/pdf"
acrobatPath = r'C:\Program Files\Adobe\Reader 9.0\Reader\AcroRd32.exe'
subprocess.Popen("%s %s" % (acrobatPath, pdf))
```

You can also write the last line like this: `subprocess.Popen([acrobatPath, pdf])`. Suffice it to say, using the subprocess module is also a breeze. There are many other ways to use the subprocess module, but this is one of its primary tasks. I usually use it to open a specific file (like above) or to open a program for me with specific arguments applied. I also use subprocess's "call" method, which causes the Python script to wait for the "called" application to complete before continuing. You can also communicate with the processes

Python 101 + Screencast

Get Python 101 + the Screencast

Example



Python 3.7.0 Shell

```
File Edit Shell Debug Options Window Help
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
```

"Untitled"

```
File Edit Format Run Options Window Help
import os
os.system("E:\OneDrive\My Teaching\Computer Programming Course\Presentations\Week 01\Python\clip.mov")

import time
time.sleep(10)
```

Ln: 7 Col: 0

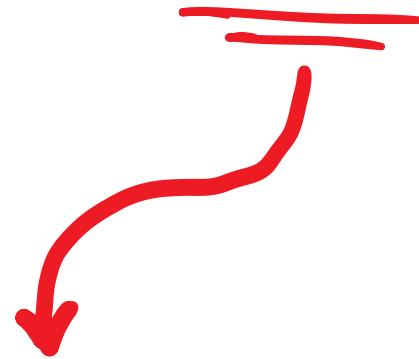
Example



Repeat Two Times:

- Wait Two Hours
- ~~Open A File~~

How to Open a File or
Program in Python



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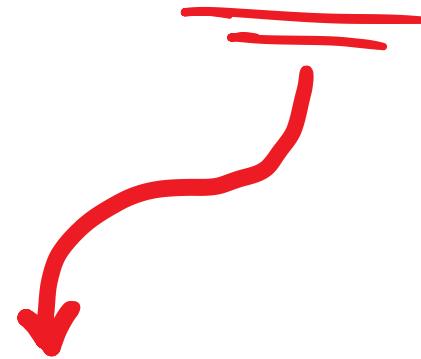
Example



Repeat Two Times:

- Wait Two Hours
- ~~Open A File~~

Python Make My
Program Wait



Google

Example



Google search results for "Python make my program wait".

Search query: Python make my program wait

Number of results: About 2,270,000 results (0.72 seconds)

Top result:

4 Answers 4. You can use the method sleep() in module time . First you must import module time in your **program**. After that, you can call the sleep() function. Mar 18, 2013

[Make Python Program Wait - Stack Overflow](https://stackoverflow.com/questions/15472707/make-python-program-wait)
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Make Python Program Wait - Stack Overflow
stackoverflow.com/questions/15472707/make-python-program-wait ▾
Mar 18, 2013 - 4 Answers 4. You can use the method sleep() in module time . First you must import module time in your **program**. After that, you can call the sleep() function.

[Make Python Program Wait](#)
I need to make my python program
wait for 200ms before ...
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Third result:

sleep - How can I make a time delay in Python? - Stack Overflow
stackoverflow.com/questions/510348/how-can-i-make-a-time-delay-in-python ▾
Feb 4, 2009 - I would like to know how to put a time delay in a **Python** script. ... Event.wait How do I get my **python** program to sleep for 50 milliseconds?

Fourth result:

multithreading - Python: How to make program wait till function's or ...
stackoverflow.com/.../python-how-to-make-program-wait-till-functions-or-methods-c... ▾
Mar 17, 2014 - Use a queue: each thread when completed puts the result on the queue and then Additionally, it doesn't have to be an array that is being populated in the end, but for my example that how I used it. Hope this simplifies or ...

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How To Make a Python Program Wait | Udacity
How to make a Python program wait for a certain amount of time

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Make Python Program Wait

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I need to make my python program wait for 200ms before polling for an input of some description. In C# for example, I could use `Thread.Sleep()` to achieve this. What is the simplest means of doing this in python?

4 python share edit 6

asked Mar 18 '13 at 8:49 richzilla

3 years ago 14223 times 3 days ago

BLOG

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Example



Python make my program × Make Python Program × Pooya

stackoverflow.com/questions/15472707/make-python-program-wait

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4 Answers

active oldest votes

13 Use Time module.

For example, to delay 1 second :

```
import time
time.sleep(1) # delay for 1 seconds
```

In your case, if you want to get 200 ms, use this instead:

```
time.sleep(0.2)
```

time.sleep also works with float.

share edit answered Mar 18 '13 at 8:51

 Thanakron Tandavas
3,109 ● 2 ● 15 ● 35

add a comment

If you simply want to sleep you can try:

HOT META POSTS

13 Why was this question migrated Stack Overflow to EE.SE, and can we...

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\$25,000 - \$30,000 🔍 REMOTE
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ruby network

SaaSOps Software Engineering Manager \$100k
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Example



Python 3.7.0 Shell

File Edit Shell Debug Options Window Help

Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)] on win32

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>>>

```
Untitled
File Edit Format Run Options Window Help
import os
os.system("E:\OneDrive\My Teaching\Computer Programming Course\Presentations\Week 01\Python\clip.mov")

import time
time.sleep(10)

Ln: 7 Col: 0
```

4:38 PM 10/4/2018

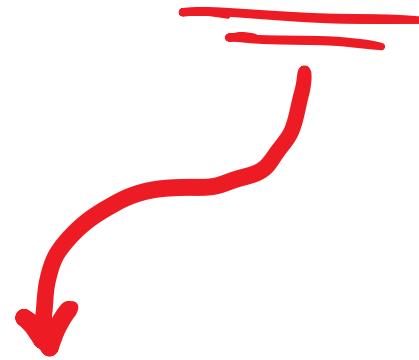
Example



Repeat Two Times:

- ~~Wait Two Hours~~
- ~~Open A File~~

Python Make My
Program Wait



Google

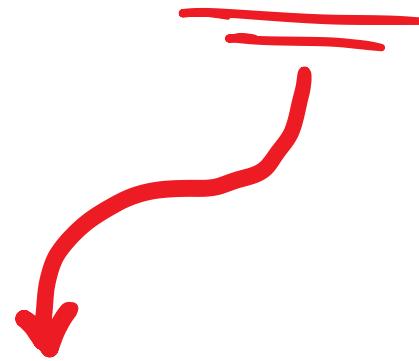
Example



Repeat Two Times:

- ~~Wait Two Hours~~
- ~~Open A File~~

Loop in Python



Google

Example



loop in python - Google

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Python programming language provides following types of **loops** to handle looping requirements. Repeats a statement or group of statements while a given condition is TRUE. ... Executes a sequence of statements multiple times and abbreviates the code that manages the **loop** variable.

Python Loops - TutorialsPoint
https://www.tutorialspoint.com/python/python_loops.htm

ForLoop - Python Wiki
<https://wiki.python.org/moin/ForLoop> ▾
Apr 14, 2013 - For loops. Usage in Python. When do I use for loops? For loops are traditionally used when you have a piece of code which you want to repeat ...

4. More Control Flow Tools – Python 3.6.0 documentation
<https://docs.python.org/3.6/tutorial/controlflow.html> ▾
If you need to modify the sequence you are iterating over while inside the loop (for example to duplicate selected items), it is recommended that you first make a ...

Python for Loop Statements - TutorialsPoint
https://www.tutorialspoint.com/python/python_for_loop.htm ▾
Python for Loop Statements. It has the ability to iterate over the items of any sequence, such as a list or a string.

Python Loops - TutorialsPoint
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Python programming language provides following types of **loops** to handle looping requirements. Repeats a statement or group of statements while a given condition is TRUE. ... Executes a sequence of statements multiple times and abbreviates the code that manages the loop variable.

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Example



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Diagram:

```
graph TD; Start(( )) --> Condition{Condition}; Condition -- "If condition is true" --> ConditionalCode[Conditional Code]; ConditionalCode --> Condition; Condition -- "If condition is false" --> End(( ));
```

Python programming language provides following types of loops to handle looping requirements.

Loop Type	Description
while loop	Repeats a statement or group of statements while a given condition is TRUE. It tests the condition before executing the loop body.
for loop	Executes a sequence of statements multiple times and abbreviates the code that manages the loop variable.
nested loops	You can use one or more loop inside any another while, for or do..while loop.

Loop Control Statements

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Flow Diagram

```
graph TD; Start(( )) --> Cond{condition}; Cond -- "If condition is true" --> CondCode[conditional code]; CondCode --> End(( )); Cond -- "If condition is false" --> Body[while expression : statement(s)]; Body --> Cond;
```

Here, key point of the while loop is that the loop might not ever run. When the condition is tested and the result is false, the loop body will be skipped and the first statement after the while loop will be executed.

Example

```
#!/usr/bin/python

count = 0
while (count < 9):
    print 'The count is:', count
    count = count + 1

print "Good bye!"
```

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Example



Python 3.7.0 Shell

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Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 27 2018, 04:06:47) [MSC v.1914 32 bit (Intel)] on win32

Type "copyright", "credits" or "license()" for more information.

>>>

```
File Edit Format Run Options Window Help
import os
os.system("E:\OneDrive\My Teaching\Computer Programming Course\Presentations\Week 01\Python\clip.mov")

import time
time.sleep(120)

count = 0
while (count < 2):
    print("The Count is:", count)
    count = count + 1

|
```

Ln: 13 Col: 0

4:41 PM 10/4/2018

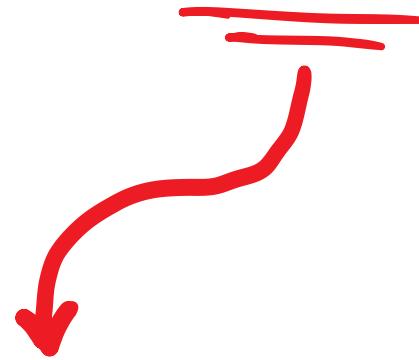
Example



~~Repeat Two Times:~~

- ~~- Wait Two Hours~~
- ~~- Open A File~~

Loop in Python



Google

Example



Python 3.7.0 Shell

```
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>>>
```

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```
File Edit Format Run Options Window Help
import time
import os

count = 0
while (count < 2):
    time.sleep(120)
    os.system("E:\OneDrive\My Teaching\Computer Programming Course\Presentation\Week 01\Python\clip.mov")
    count = count + 1
```

Ln: 8 Col: 21

Ln: 3 Col: 4

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Example



Python 3.7.0 Shell

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Print Window Ctrl+P

Close Alt+F4
Exit Ctrl+Q

drive\My Teaching\Computer Programming Course\Presentations\Week 01\Python\clip.mov")

Ln: 9 Col: 4

Example



Python 3.7.0 Shell

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Ln: 9 Col: 4

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Example



Python 3.7.0 Shell

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Time For A Breakpy - E:\OneDrive\My Teaching\Computer Programming Course\Presentations\Week 01\Python\Time For A Break.py (3.7.0)

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import time Python Shell

import os Check Module Alt+X

Run Module F5

```
count = 0
while (count < 2):
    time.sleep(120)
    os.system("E:\OneDrive\My Teaching\Computer Programming Course\Presentations\Week 01\Python\clip.mov")
    count = count + 1
```

Ln: 9 Col: 4

Example

