VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE | DEPARTMENT OF COMPUTER SCIENCE

Scripting Languages
(Tutorials)

460-2060

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Tutorials Organization

- Note that (all) exercises are graded

- **10 small assignments**: 10 · 4 points = 40 points

  (10 point is min. and 30 points is max.)
- **Django project**: 30 points (10 point is min.)

- Assigned tasks must be submitted via e-mail by the specified deadline

Exercise	Deadline*	Points
SA01	16. 2. 2021	4
SA02	23. 2. 2021	4
SA03	2. 3. 2021	4
SA04	9. 3. 2021	4
SA05	16. 3. 2021	4
SA06	23. 3. 2021	4
SA07	30. 3. 2021	4
SA08	6. 4. 2021	4
SA09	13. 4. 2021	4
SA10	20. 4. 2021	4
DP	TBA	30

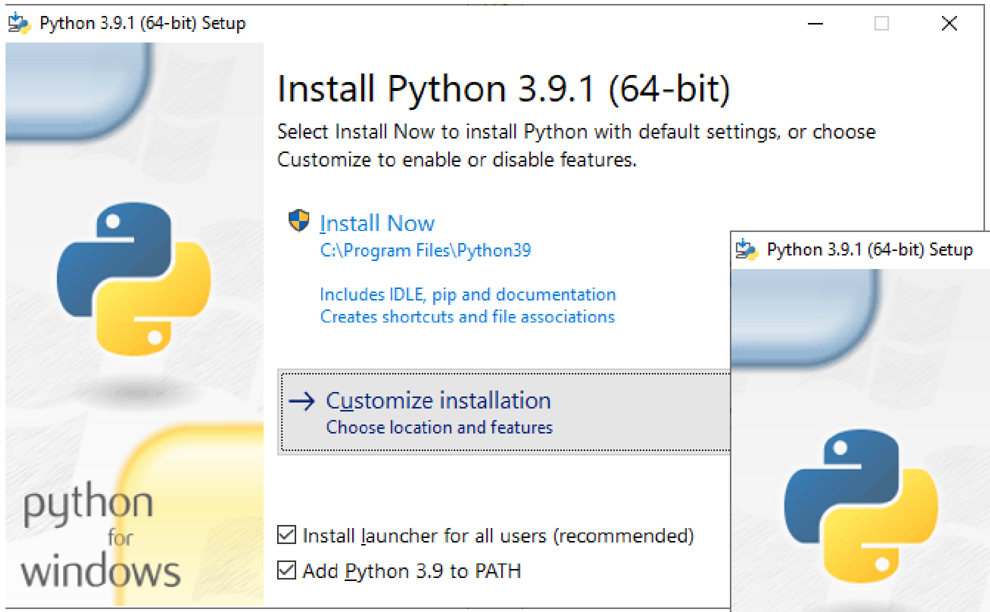
* by the end of the day

Python Installation

- Visit **python.org** website
- Download preferred distribution for your platform
- You can choose nearly any text editor to write scripts in Python language
- Text editor should have the ability to show whitespaces
- Be aware of the code page

• Tutorials	docs.python.org/3/tutorial/index.html
• Language reference	docs.python.org/3/reference/index.html
• Library reference	docs.python.org/3/library/index.html

Python Installation


Python 3.9.1 (64-bit) Setup

Install Python 3.9.1 (64-bit)

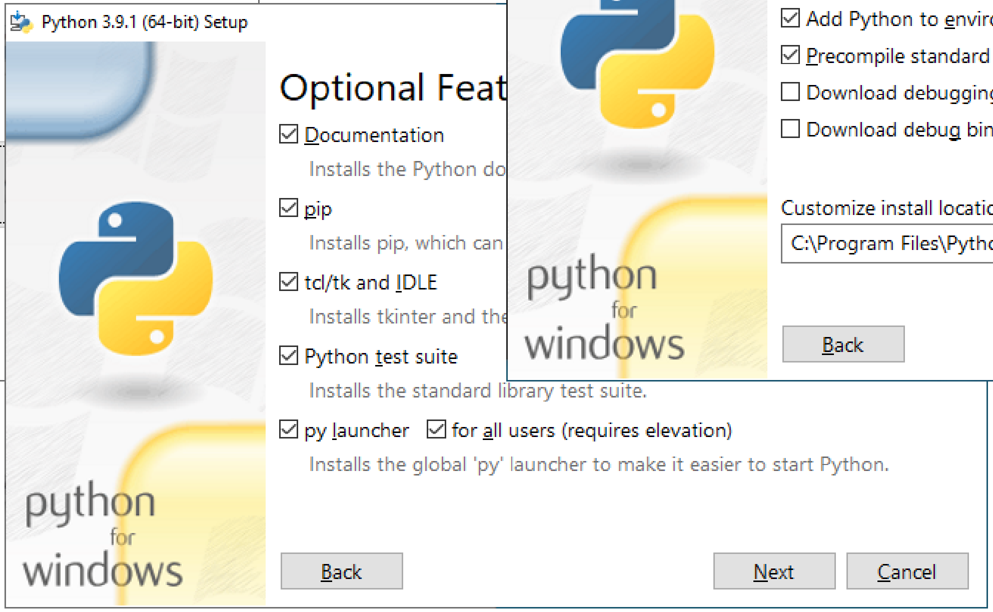
Select Install Now to install Python with default settings, or choose Customize to enable or disable features.

Install Now
C:\Program Files\Python39

Includes IDLE, pip and documentation
Creates shortcuts and file associations

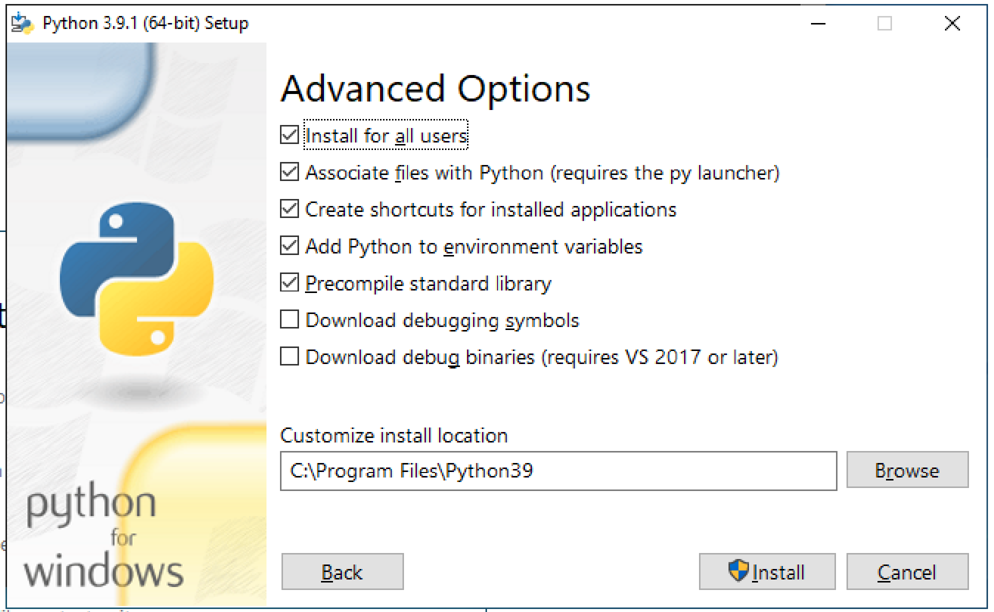
→ Customize installation
Choose location and features

☑ Install launcher for all users (recommended)
☑ Add Python 3.9 to PATH


Python 3.9.1 (64-bit) Setup

Optional Feat

☑ Documentation
Installs the Python do
☑ pip
Installs pip, which can
☑ tcl/tk and IDLE
Installs tkinter and the
☑ Python test suite
Installs the standard library test suite.
☑ py launcher ☑ for all users (requires elevation)
Installs the global 'py' launcher to make it easier to start Python.


Python 3.9.1 (64-bit) Setup

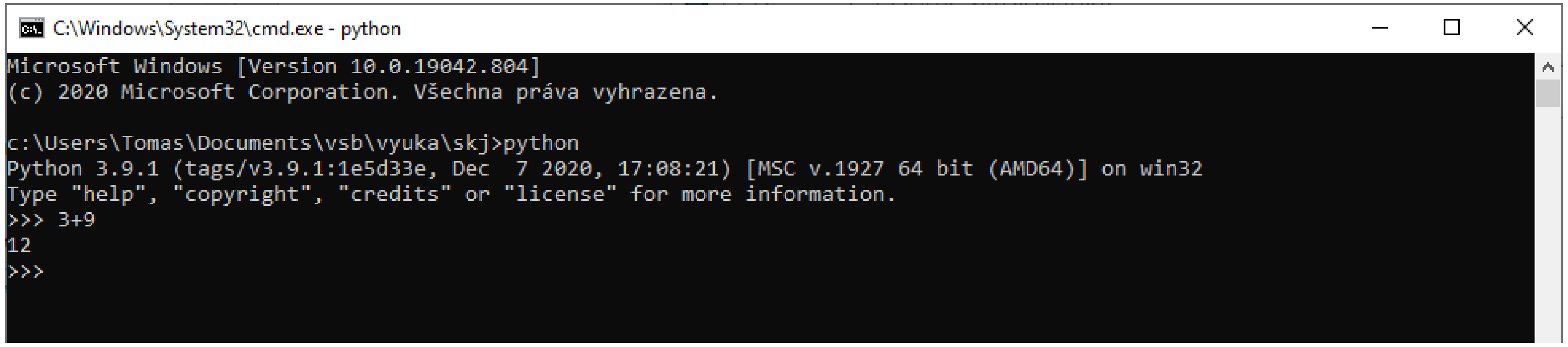
Advanced Options

☑ Install for all users
☑ Associate files with Python (requires the py launcher)
☑ Create shortcuts for installed applications
☑ Add Python to environment variables
☑ Precompile standard library
☐ Download debugging symbols
☐ Download debug binaries (requires VS 2017 or later)

Customize install location
C:\Program Files\Python39

Interactive Python Console

- Try to run the Python interpreter right from the console…



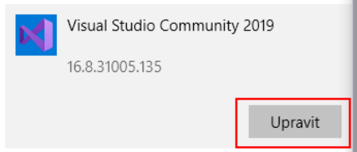
C:\Windows\System32\cmd.exe - python

```
Microsoft Windows [Version 10.0.19042.804]
(c) 2020 Microsoft Corporation. Všechna práva vyhrazena.

c:\Users\Tomas\Documents\vsb\vyuka\skj>python
Python 3.9.1 (tags/v3.9.1:1e5d33e, Dec  7 2020, 17:08:21) [MSC v.1927 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> 3+9
12
>>>
```

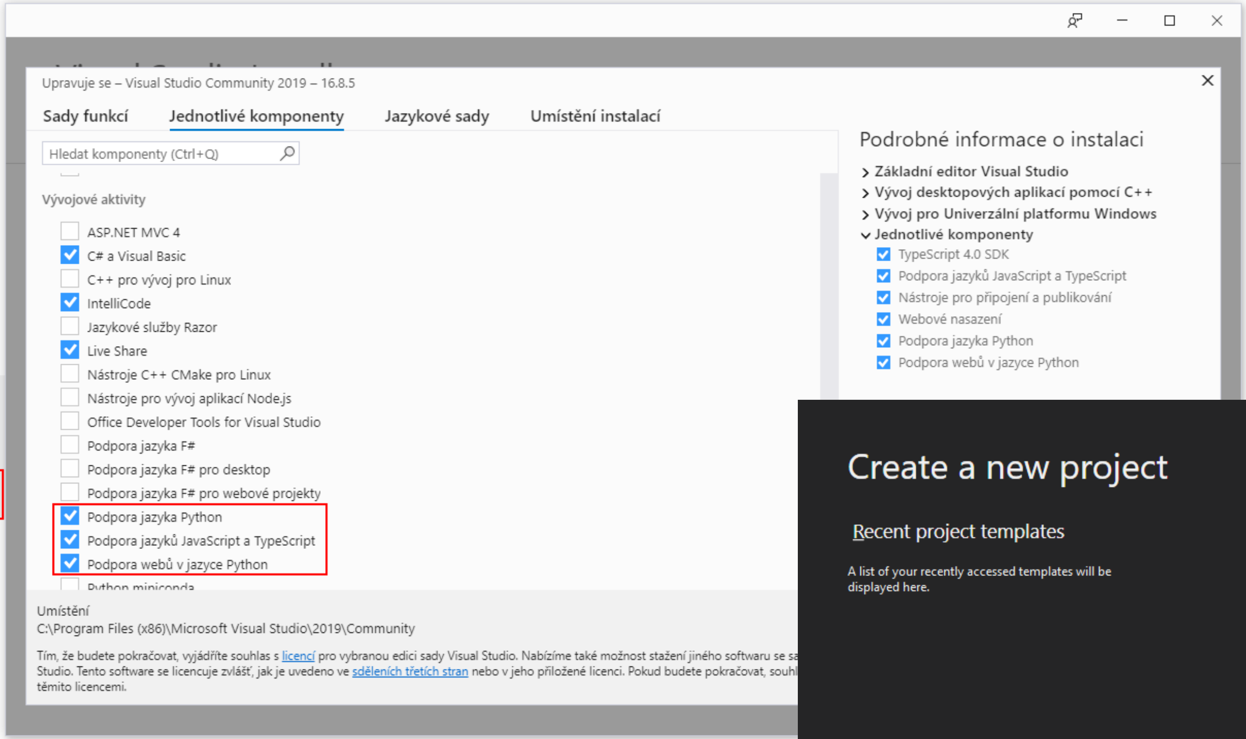
- If Python is not found, try to set the PATH environment variable
- `set PATH=%PATH%;C:\Program Files\Python39`

Python in Visual Studio



Visual Studio Community 2019

16.8.31005.135



Upravuje se – Visual Studio Community 2019 – 16.8.5

Vývojové aktivity

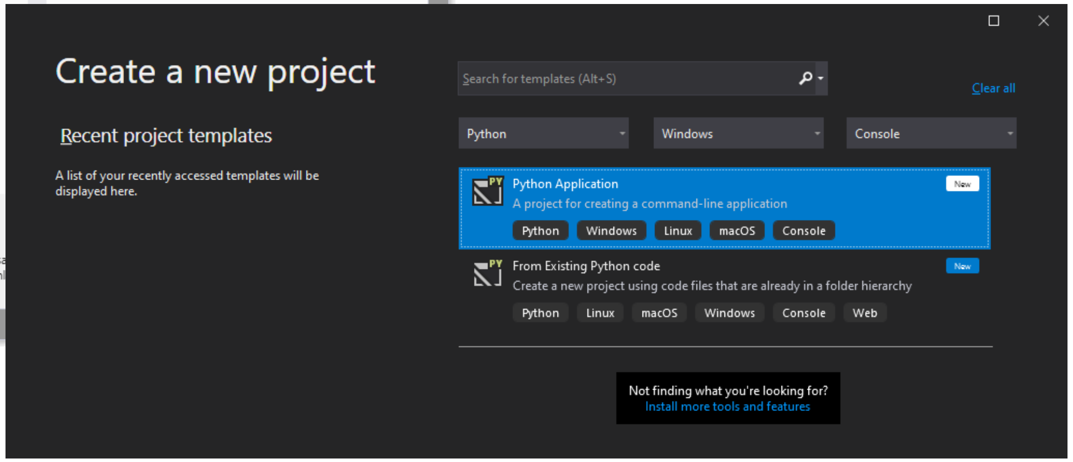
- [ ] ASP.NET MVC 4
- [x] C# a Visual Basic
- [ ] C++ pro vývoj pro Linux
- [x] IntelliCode
- [ ] Jazykové služby Razor
- [x] Live Share
- [ ] Nástroje C++ CMake pro Linux
- [ ] Nástroje pro vývoj aplikací Node.js
- [ ] Office Developer Tools for Visual Studio
- [ ] Podpora jazyka F#
- [ ] Podpora jazyka F# pro desktop
- [ ] Podpora jazyka F# pro webové projekty
- [x] Podpora jazyka Python
- [x] Podpora jazyků JavaScript a TypeScript
- [x] Podpora webů v jazyce Python
- [ ] Python miniconda

Podrobné informace o instalaci

- Základní editor Visual Studio
- Vývoj desktopových aplikací pomocí C++
- Vývoj pro Univerzální platformu Windows
- Jednotlivé komponenty
  - [x] TypeScript 4.0 SDK
  - [x] Podpora jazyků JavaScript a TypeScript
  - [x] Nástroje pro připojení a publikování
  - [x] Webové nasazení
  - [x] Podpora jazyka Python
  - [x] Podpora webů v jazyce Python

Umístění
C:\Program Files (x86)\Microsoft Visual Studio\2019\Community

Tím, že budete pokračovat, vyjádříte souhlas s licencí pro vybranou edici sady Visual Studio. Nabízíme také možnost stažení jiného softwaru se sa Studio. Tento software se licencuje zvlášť, jak je uvedeno ve sděleních třetích stran nebo v jeho přiložené licenci. Pokud budete pokračovat, souhl těmito licencemi.



Create a new project

Recent project templates

A list of your recently accessed templates will be displayed here.

Python Application — New
A project for creating a command-line application
Python · Windows · Linux · macOS · Console

From Existing Python code — New
Create a new project using code files that are already in a folder hierarchy
Python · Linux · macOS · Windows · Console · Web

Not finding what you're looking for?
Install more tools and features

First Script

```python
#!/usr/bin/env python3
# -*- coding: utf-8 -*-

__author__    = "Tomas Fabian"
__copyright__ = "(c)2021 VSB-TUO, FEECS, Dept. of Computer Science"
__email__     = "tomas.fabian@vsb.cz"
__version__   = "0.1.0"

"""
A very simple script made in Python
"""
def main():
    print("Hello, World!")

# checks whether our script is running as the main program or as a module
if __name__ == "__main__":
    main()
```

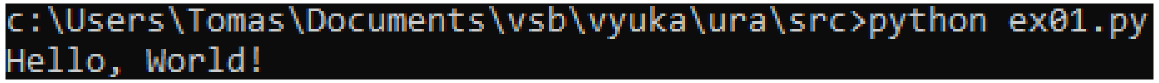
sets the code page

basic info about the source code

multiline comment

Python uses indentation to define a block of code
The amount of indentation (e.g. 4 whitespaces)
must be consistent throughout that block

single line comment



```
c:\Users\Tomas\Documents\vsb\vyuka\ura\src>python ex01.py
Hello, World!
```

Elementary Commands

```
# elementary commands
a = 5 # ints
a = 3.14 # floats
# strings
a = "This is 'positive'"
a = 5//3 # a equals to 1
a = 5/3 # a equals to 1.667
a = True and False
a = True or False
a = True is True
a = True == True
a = not True
# bitwise and
a = 1 & 3 # a equals to 1
# bitwise or
a = 1 | 3 # a equals to 3
```

```
# definition of a function
def my_function(a, b=0):
  c = a + b
  return c

# function call
print(my_function(1, 3))

# program flow control
a = 5
if a > 0:
  print("positive")
elif a == 0:
  print("zero")
else:
  print("negative")

while True:
  print("never ending loop")
# there is no switch statement
```

Abstract Data Types (ADTs) in Python

```
# list
lst = [1, 2, 3, "hi there"]
len(lst)
output: 4
print(type(lst[3]))
output: <class 'str'>
lst[1] = 22 # list is mutable
print(lst)
output: [1, 22, 3, "hi there"]
```

```
# tuple
vec = (1.2, 3.4, -8.9)
print(len(vec))
output: 3
```
~~vec[0] = -1.2~~ `# tuple is immutable`

```
# dict - dictionary (mutable)
dct = {1: "one", 2: "two"}
print(dct[2])
output: two
```

```
# set (immutable)
s = set((1, 2, 3, 4, 4, 4))
print(s)
output: {1, 2, 3, 4}
```

Try `help(list)` command to see what all you can do with ADTs

Classes

```
class MyClass(object):
  __count = 0

  def __init__(self, x=0):
    self.__x = x
    MyClass.count += 1

  def get_x(self):
    return self.__x

  def set_x(self):
    self.__x = x

  x = property(get_x, set_x)

  def __str__(self):
    return "X equals to {}".format(self.__x)

  @staticmethod
  def count():
    return MyClass.__count
```

```
class MyAddableClass(MyClass):
  def __init__(self, x):
    super().__init__(x):

  def __add__(self, other):
    if type(other) in [MyClass, MyAddableClass]:
      return MySuperClass(self.x + other.x)
    elif type(other) in [int, float]:
      return MySuperClass(self.x + other)
    raise TypeError

a = MyClass()
a.x = 7
print(a.x)
out: 7
b = MySuperClass(3)
c = a + b
print(c)
out: 10
```