CS2506 Operating Systems II

Application Programming Interface (API)

LAB4

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1. Task 1

Read the documentation pointed by the link
https://docs.python.org/3/library/os.html

2. Task 2

```
'''
task2.py

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CS2506 Operating Systems 2 – Lab4 – Application Programming Interface
'''
Import os # import the operating system module

os.getcwd( ) # returns a string representation of the current working directory also known as PWD
```
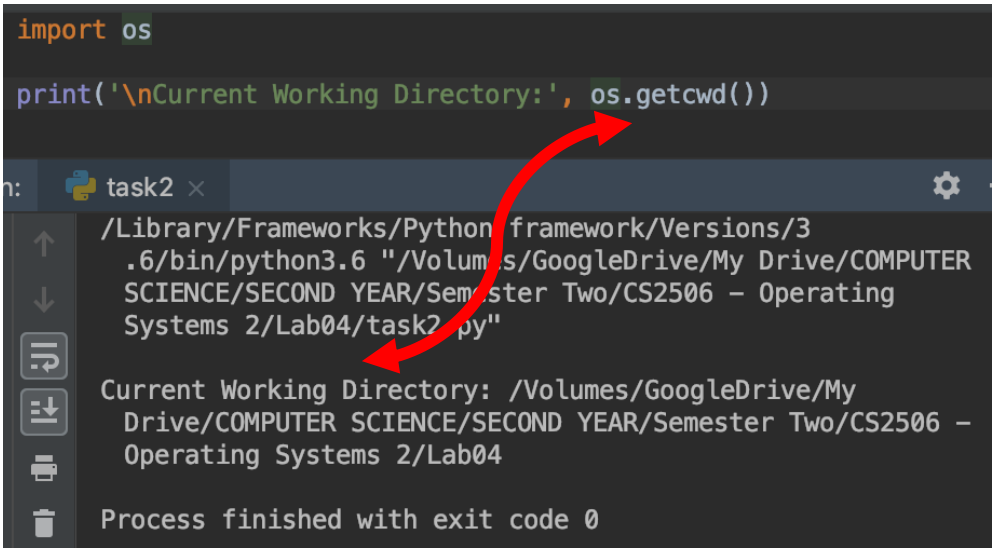
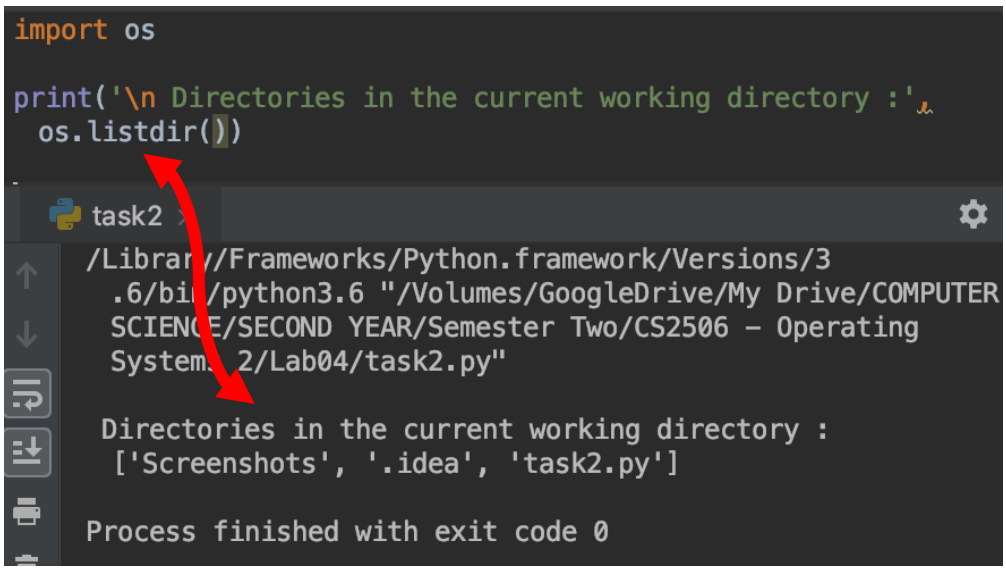
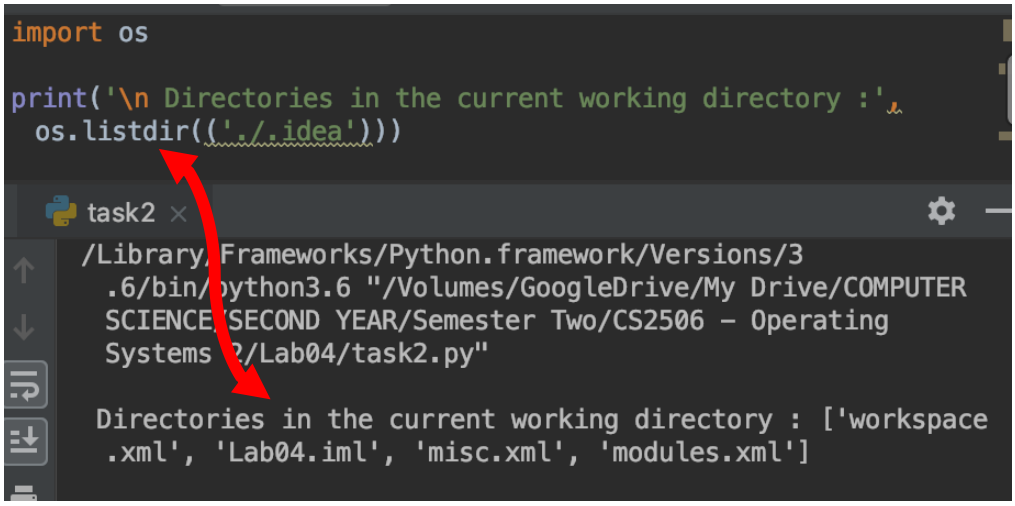



String representation of current working directory using os.getcwd ( )

os.listdir ( ) # returns a list of all the files in the current directory or specified path. Similar to 'ls' when used in the terminal

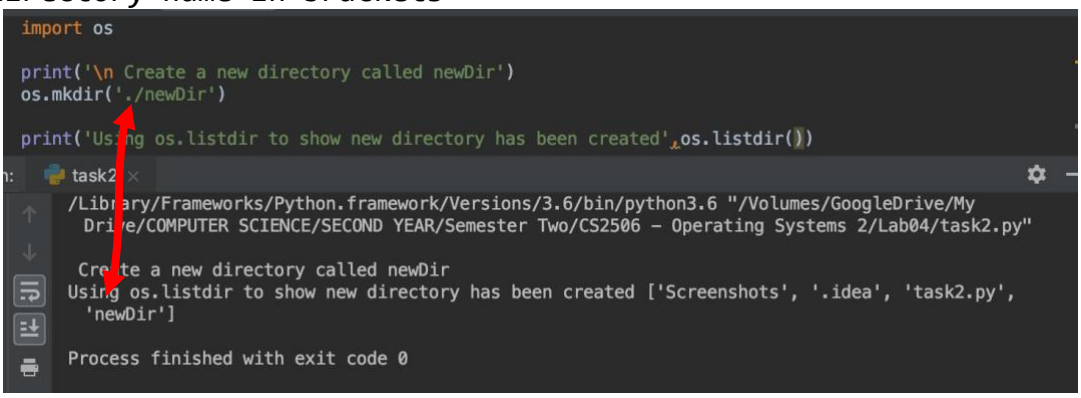


Returns a list of files within the current working directory



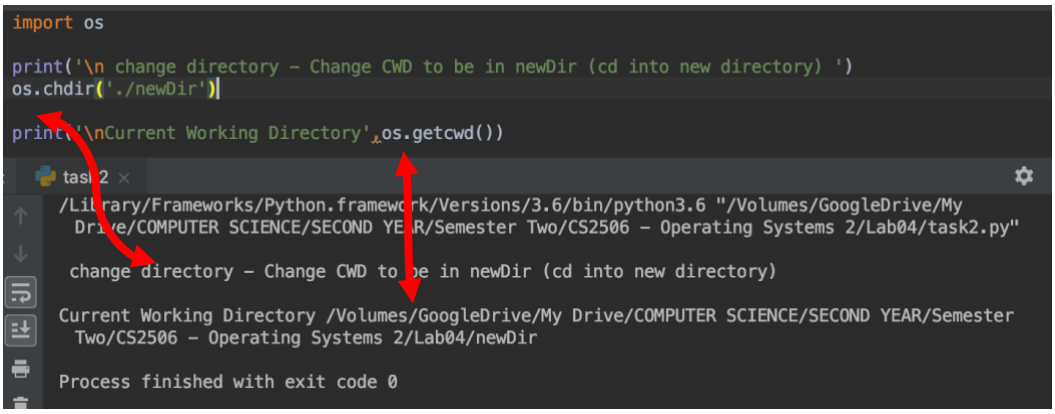
Returns a list of files within a specified path, as above './.idea'

os.mkdir ('./mkdir') # creates a new directory with the new directory name in brackets



Making a new directory called 'newDir' using os.mkdir, and then using os.listdir() to show that the new directory has been created

os.chdir ('./newdir') # moves into the specified directory (newdir), similar to CD in the terminal, changes the working directory



Above we are changing the working directory to be in the newDir directory, then I am using os.getcwd() to show what directory we are in

Python Batch File:

```
#! /usr/bin/env python

import os

print('Welcome to the file Control System')
print('\t1  >> Create a new file')
print('\t2  >> Get the current working directory')
print('\t3  >> Change directory')
print('\t4  >> List the contents of the current directory')
print('\t5  >> Read the contents of a file')
print('\t6  >> Copy an existing file into a new directory')
print('\t7  >> Exit system')
def inputcode():
    inp = input('Please enter an option: ')
    inp = int(inp)
    while inp:
        if inp == 1:
            dirname = input('Please enter name of directory you wish to create: ')
            if dirname:
                os.mkdir('./ %s' % dirname)
                print('Directory > %s < successfully created' % dirname)
                inputcode()
            else:
                print('Please try again')
                inputcode()
        elif inp == 2:
            print(' Your current working directory is:\n')
            print(os.getcwd(),'\n')
            inputcode()
        elif inp == 3:
            newpath = input('New path: ')
            os.chdir('%s' % newpath)
            print('Your location is now: ', os.getcwd())
            inputcode()
        elif inp == 4:
            print('Directory contents:\n')
            print(os.listdir('.'),'\n')
            inputcode()
        elif inp == 5:
            filename = input('Please enter the name of the file you wish to open,
including the extension:')
            file = os.open("%s" % filename, os.O_RDWR)
            read = os.read(file,1024)
            print(read,'\n')
            os.close(file)
            inputcode()
        elif inp == 6:
            path1 = input('Enter path of file you wish to move:')
            path2 = input('Enter the path of the directory you wish to copy this
file into:')
            os.rename(path1,path2)
            print('File now moved to: %s' % path2)
        elif inp == 7:
            os._exit(0)
        else:
            print('Please enter a valid option')


if __name__ == "__main__":
    inputcode()
```

```
#! /usr/bin/env python

import os

print('Welcome to the file Control System')
print('\t1  >> Create a new file')
print('\t2  >> Get the current working directory')
print('\t3  >> Change directory')
print('\t4  >> List the contents of the current directory')
print('\t5  >> Read the contents of a file')
print('\t6  >> Copy an existing file into a new directory')
print('\t7  >> Exit system')
def inputcode():
    inp = input('Please enter an option: ')
    inp = int(inp)
    while inp:
        if inp == 1:
            dirname = input('Please enter name of directory you wish to create: ')
            if dirname:
                os.mkdir('./ %s' % dirname)
                print('Directory > %s < successfully created' % dirname)
                inputcode()
            else:
                print('Please try again')
                inputcode()
        elif inp == 2:
            print(' Your current working directory is:\n')
            print(os.getcwd(),'\n')
            inputcode()
        elif inp == 3:
            newpath = input('New path: ')
            os.chdir('%s' % newpath)
            print('Your location is now: ', os.getcwd())
            inputcode()
        elif inp == 4:
            print('Directory contents:\n')
            print(os.listdir('.'),'\n')
            inputcode()
        elif inp == 5:
            filename = input('Please enter the name of the file you wish to open,
including the extension:')
            file = os.open("%s" % filename, os.O_RDWR)
            read = os.read(file,1024)
            print(read,'\n')
            os.close(file)
            inputcode()
        elif inp == 6:
            path1 = input('Enter path of file you wish to move:')
            path2 = input('Enter the path of the directory you wish to copy this file
into:')
            os.rename(path1,path2)
            print('File now moved to: %s' % path2)
        elif inp == 7:
            os._exit(0)
        else:
            print('Please enter a valid option')
```

Python code screenshot

```
Colins-MacBook-Pro:Lab04 colinkelleher$ python3 task2.py
Welcome to the file Control System
        1  >> Create a new file
        2  >> Get the current working directory
        3  >> Change directory
        4  >> List the contents of the current directory
        5  >> Read the contents of a file
        6  >> Copy an existing file into a new directory
        7  >> Exit system
Please enter an option: 2
 Your current working directory is:

/Volumes/GoogleDrive/My Drive/COMPUTER SCIENCE/SECOND YEAR/Semester Two/CS2506 - Operating
Systems 2/Lab04

Please enter an option: 4
Directory contents:

['Screenshots', '.idea', 'task2.py', 'newDir', 'Lab4.docx', 'task3.py', 'sampleProgram.py',
'program.sh', 'script.sh', 'test.txt', 'os2']

Please enter an option: 5
Please enter the name of the file you wish to open, including the extension:test.txt
b'THIS IS A TEST FILE FOR OS2 LAB04 2019'

Please enter an option: 3
New path: /Users/colinkelleher/Desktop
Your location is now:  /Users/colinkelleher/Desktop

Please enter an option: 2
 Your current working directory is:

/Users/colinkelleher/Desktop

Please enter an option: 4
Directory contents:

['Screenshot 2019-03-19 at 17.39.02.png', 'Car', 'Mars4_5.jar', '.DS_Store', '.localized',
'117303363-sys8.asm', 'dreampopulate.sql', 'Working_Files', '.test.txt.swp', '117303363-
parseNumbers.asm ', 'test.txt', 'mips2.asm', ' osTestDir', '.test.txt.swo']

Please enter an option: 1
Please enter name of directory you wish to create: osTestDir2
Directory > osTestDir2 < successfully created

Please enter an option: 6
Enter path of file you wish to move:/Users/colinkelleher/Desktop/mips2.asm
Enter the path of the directory you wish to copy this file into:/Users/colinkelleher/
Desktop/osTestDir2/mips2.asm
File now moved to: /Users/colinkelleher/Desktop/osTestDir2/mips2.asm

Please enter an option: 3
New path: /Users/colinkelleher/Desktop/osTestDir2
Your location is now:  /Users/colinkelleher/Desktop/osTestDir2
Please enter an option: 4
Directory contents:

['mips2.asm']

Please enter an option: 7
Colins-MacBook-Pro:Lab04 colinkelleher$
```

Terminal Result of running code

Benefits of this script include:

- *Ease of use – simple menu option to follow*
- *Runnable with one click on an icon*
- *Useful for people with little computing knowledge*
- *Informs you of what you have completed*

3. Task3

```
'''
task3.py

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CS2506 Operating Systems 2 – Lab4 – Application Programming
Interface (API)
'''
```
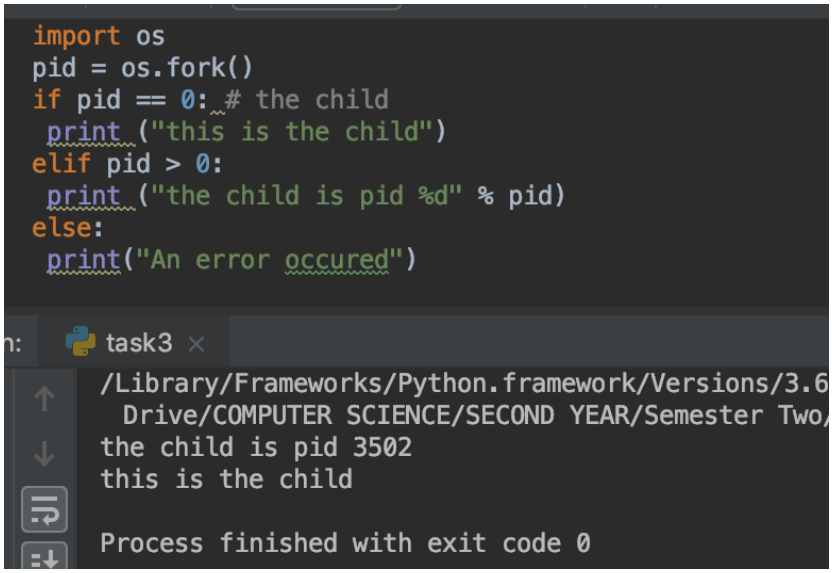
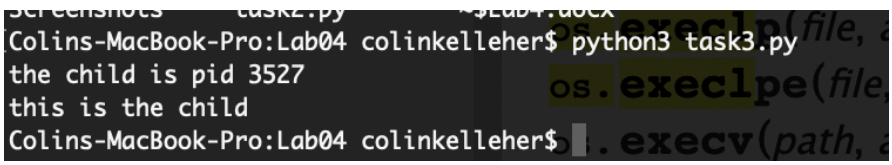

Run the following code:

```
import os
pid = os.fork()
if pid == 0: # the child
 print ("this is the child")
elif pid > 0:
 print ("the child is pid %d" % pid)
else:
 print("An error occurred")
```



Result of running the above code



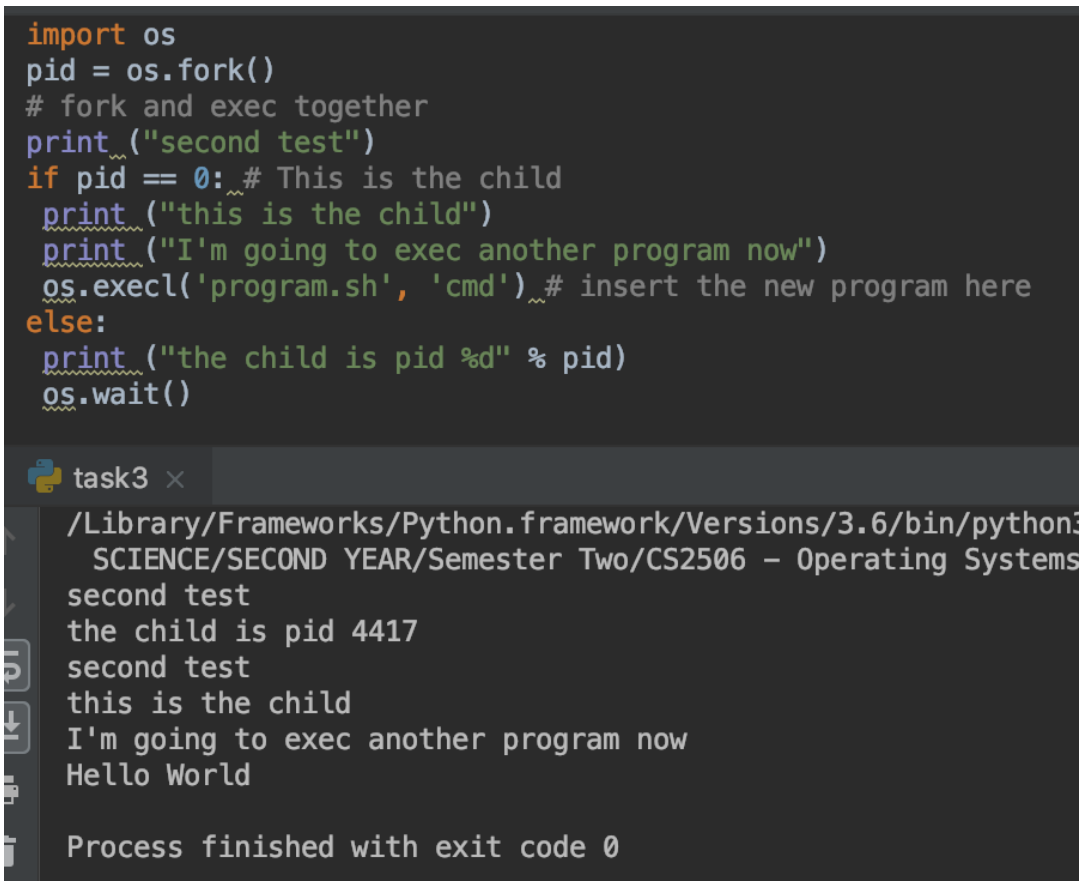
Running above code from terminal

In the next code you need to insert the new program commanded by execl:

```
import os
pid = os.fork()
# fork and exec together
print ("second test")
if pid == 0: # This is the child
 print ("this is the child")
 print ("I'm going to exec another program now")
 os.execl('program.sh', 'cmd') # insert the new program here
else:
 print ("the child is pid %d" % pid)
 os.wait()
```

I wrote a simple bash script ‘program.sh’ which is as below:

```
#!/bin/bash
echo "This is a bash program which prints this line for OS2 Lab04"
```



Code and output with result, when ‘program.sh’ was inserted

4. Task4

```
'''
task4.py

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CS2506 Operating Systems 2 - Lab4 - Application Programming
Interface
'''
```

```
import platform #import the platform module
import os #import the operating system module


x = platform.system() #get the platform - linux or windows
print('The operating system is:',x) #print the platform

if x == 'Darwin': #if the operating system is Darwin
    print(os.fork()) #fork
elif x == 'Linux': #if the operating system is Linux
    print(os.fork())
elif x == 'Windows': #if the operating system is Windows
    print(os._spawn())
```

Code with comments detecting the platform, and then forking or spawning depending on the OS

I completed this code on my mac, therefore the system I am running is Darwin, hence Darwin being involved in the code

```
import platform #import the platform module
import os #import the operating system module


x = platform.system() #get the platform - linux or windows
print('The operating system is:',x) #print the platform

if x == 'Darwin': #if the operating system is Darwin
    print(os.fork()) #fork
elif x == 'Linux': #if the operating system is Linux
    print(os.fork())
elif x == 'Windows': #if the operating system is Windows
    print(os._spawn())
```

```
n:  task4 ×
/Library/Frameworks/Python.framework/Versions/3.6/bin/py
 "/Volumes/GoogleDrive/My Drive/COMPUTER SCIENCE/SECOND
 Operating Systems 2/Lab04/task4.py"
The operating system is; Darwin
7196
0

Process finished with exit code 0
```

Output of running the above code