**APCSP Activity 1.4.2: Objects and Methods**

Learning Target: Define the problem and analyze research to create a solution to a problem.

**Step 3**

If we were currently working in the admin directory, what would be the relative filename for nice?

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| --- |
| ../Student login/Desktop/nice.jpg |

**Step 4**

Use the directory commands to navigate up and down different directories in the iPython session using the listed commands. Provide a screenshot of the output.

**Step 5**

How would you name the file C:\Windows\Cursors\cursor1.png using escape characters for the backslashes?

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| --- |
| C:\\Windows\\Cursors\\cursor1.png |

Is this an absolute filename or a relative filename? Do you have to be in a particular working directory for this filename to make sense?

This is an absolute filename because the filename starts with the original surface directly which is “C:\”

**Step 7**

What is the (x,y) coordinate pair of the woman’s nose in the image coordinate system?

(290, 400)

Change the code so that it shows the cat. What are the image coordinates at the tip of the cat’s nose?

(60, 40)

**Step 8**

a. Fill in the blank:

|  |  |
| --- | --- |
| fig is an instance of the class | matplotlib.figure.Figure |
| ax is an instance of the class | matplotlib.axes.\_subplots.AxesSubplot |

b. Fill in the blank:

|  |  |
| --- | --- |
| Similarly, in line 22, the method | show() |
| is being called on the object | fig |
| That method is being given | no arguments. |
| That method is a method of the class | matplotlib.figure.Figure |

|  |
| --- |
| 1: '''  2: JDoe\_JSmith\_1\_4\_2: Read and show an image.  3: '''  4: import matplotlib.pyplot as plt  5: import os.path  6: import numpy as np *# "as" lets us use standard abbreviations*  7:   8: '''Read the image data'''  9: *# Get the directory of this python script* 10: directory = os.path.dirname(os.path.abspath(\_\_file\_\_))  11: *# Build an absolute filename from directory + filename* 12: filename = os.path.join(directory, 'woman.jpg') 13: *# Read the image data into an array* 14: img = plt.imread(filename) 15:  16: '''Show the image data''' 17: *# Create figure with 1 subplot* 18: fig, ax = plt.subplots(1, 1) 19: *# Show the image data in a subplot* 20: ax.imshow(img, interpolation='none') 21: *# Show the figure on the screen* 22: fig.show() |

c. Which comments explain which lines in the above code?

The multiline formatted comments (lines 8 and 16) seperates different chunks of code that does different things while the single line comments (lines 9, 11, 13, 17, 19, and 21) explain individual lines of code and what they do.

**Step 9**

a. Fill in the blank:

Modify lines 18 and 20 of your code to match what is shown above. You will have to re-execute the code to see the effect. Practice using object-oriented syntax by describing line 22:

|  |  |
| --- | --- |
| The method | subplots() |
| Is being called on the object | plt |

b. Provide screenshots of the code and output that creates the shows an image with 2 woman photos and an image with 5 cat photos.

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| --- | --- | --- |
| Woman: |  |  |
| Cat: |  |  |

**Step 11**

Use the methods in the AxesSubplot class to create three close-ups of an image in a single Figure. Each close-up should show a 10 pixel by 10 pixel region.

Screenshot of image:

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| --- |
|  |

Screenshot of code:

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**Step 12**

Look through the documentation for the class Axes, which includes the AxesSubplot subclass. Identify one additional method of the AxesSubplot. Describe at least one of the optional arguments of that method and state its default value.

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**Step 13**

In an image containing a few faces, mark the with red circles using plot().

Original Image:

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|  |

Screenshot of the Figure:

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Screenshot of the *Python* code:

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**Conclusion Questions**

1. Describe similarities and differences between absolute filenames and relative filenames.

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2. What is an object?

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3. Objects have methods and properties. What are methods and properties?

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4. What happens when you call a method on an object?

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