# Problems

### Parameter Mystery

**1.** What output is produced by the following program?

def main():

 a = 4

 b = 7

 c = -2

 mystery(a, b, c)

 mystery(c, 3, a)

 mystery(a + b, b + c, c + a)

def mystery(c, a, b):

 print(b, " + ", c, " = ", a)

main()

**2.** What output is produced by the following program?

def main():

 major = "fred"

 fred = "computer"

 computer = "department"

 department = "student"

 student = "major"

 sentence(major, fred, department)

 sentence(student, computer, fred)

 sentence("fred", "honor", computer)

 sentence("foo", "bar", "baz")

def sentence(major, fred, foo):

 print("Many a", foo, "in the", fred, " of ", major)

main()

**3.** What output is produced by the following program?

def main():

 farm = "here"

 old = "macdonald"

 macdonald = "there"

 everywhere = "farm"

 here = "everywhere"

 there = "old"

 quack = "duck"

 mystery(macdonald, there, "everywhere")

 mystery(old, macdonald, farm)

 mystery("quack", here, "there")

 mystery(quack, "here", "farm")

 mystery(old, everywhere, there)

def mystery(macdonald, farm, old):

 print(old, macdonald, "had a", farm)

main()

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# Problems (continued)

### Graphics and DrawingPanel

**4.** **a)** Generate the output shown using the DrawingPanel class.

* window size: **300x200**
* background color: **cyan**; rectangle color: **red**; diagonal line color: **black**
* position: **(50, 50)**; size: **100 px**; spacing between red lines: **20 px**

**b)** Parameterize your program so that the figure can be drawn at different positions. Change the window size to **400x300**. The first figure is still at its original position of (50, 50). The two additional figures should appear at **(250, 10)** and **(180, 115)**.

**c)** Further parameterize your program to have the sizes shown below.
The top-right figure has size **50**, and the bottom-right figure has size **180**.

|  |  |  |
| --- | --- | --- |
|  |  |  |

**5.** Using DrawingPanel, write a Python program that produces this figure:

|  |  |
| --- | --- |
|  | * size: **600x200**
* background color: **yellow**
* line color: **blue**
* vertical spacing between lines: **10 px**

The diagonal lines connect at the bottom in the middle. |

# Solutions

|  |  |
| --- | --- |
| 1. -2 + 4 = 74 + -2 = 32 + 11 = 5 | 2. Many a student in the computer of fredMany a computer in the department of majorMany a department in the honor of fredMany a baz in the bar of foo |

3. everywhere there had a old

here macdonald had a there

there quack had a everywhere

farm duck had a here

old macdonald had a farm

4.

from DrawingPanel import \* # Part (a) solution

def main():

 p = DrawingPanel(300, 200, background="cyan")

 for i in range(1, 6):

 p.draw\_rect(50, 50, i \* 20, i \* 20, outline="red")

 p.draw\_line(50, 50, 150, 150, color="black")

 # Part (b) omitted.

def main(): # Part (c) solution

 p = DrawingPanel(400, 300, background="cyan")

 draw\_figure(p, 50, 50, 100)

 draw\_figure(p, 250, 10, 50)

 draw\_figure(p, 180, 115, 180)

def draw\_figure(p, x, y, size):

 for i in range(1, 6):

 p.draw\_rect(x, y, i \* size / 5, i \* size / 5, outline="red")

 p.draw\_line(x, y, x + size, y + size, color="black")

5.

def main():

 p = DrawingPanel(600, 200, background="yellow")

 p.draw\_line(0, 0, 300, 200, color="blue")

 p.draw\_line(300, 200, 600, 0, color="blue")

 for i in range(1, 20):

 p.draw\_line(15 \* i, 10 \* i, 600 - 15 \* i, 10 \* i)