

CS 115 Sample Midterm Exam #2

1. Variable Mystery

What are the values of x , y , and z after the following code statements? (It may help you to write down their values after each line.)

$x = 10$

$y = 10$

$z = x / y$

$z = z - 3 + 20$

$x = y - 7$

$y = y + 1$

x _____

y _____

z _____

2. Expressions

For each expression at left, indicate its value in the right column. List a value of appropriate type and capitalization. e.g., 7 for an `int`, 7.0 for a `float`.

Expression

`3 * (5 - 2) - 3 - 2 * 2`

`4 * 7 % 8 + 132 % 10 + 3 % 4`

`27 // 5 // 2 + 3.4 * 2 - 1.1 * 2`

`9 + 9 % 10 % 3 - 9 / 9.0`

`19 // 2 / 2.0 + 2.5 * 6 / 2 + 0.5 * 4`

`152 % 150 + 40 // 23 / 2.0 - 6`

Result

3. If/Else Simulation

In the blank spaces below, write the output produced by the `print` in the following code when the user enters the provided values.

```
a = int(input())
b = int(input())
if a > b:
    a = a - 1
    b = b + 1
elif a == b:
    a = a + b - 4
if a < b:
    a = a + 3
else:
    b = b + 5
print(a, "to", b)
```

User Input

1 2

4 2

3 2

8 6

Output Printed

4. While Loop Mystery

In the blank spaces below, write the value(s) printed by the following code when the input listed is typed.

```
n = int(input())
x = 0
y = 0
while n > 0 && n % 2 == 0:
    x = x + 1
    y = y * 10 + n % 10
    n = n // 10

print(x, y)
```

User Input

5

28

346

265408

Output Printed

5. Boolean Expressions

Given the following variable declarations, what is the value of each of the following Boolean expressions? Write True or False for each.

`x = 10`

`y = 5`

`z = -5`

`b = True`

Expression

Result

`not b`

`b or True`

`(x > y) and (y > z)`

`(x == y) or (x <= z)`

`not (x % 2 == 0)`

`(x % 2 != 0) and b`

`b and not b`

`b or not b`

`(x < y) == b`

`not (x / 2 == 13) or b or (z * 3 == 96)`

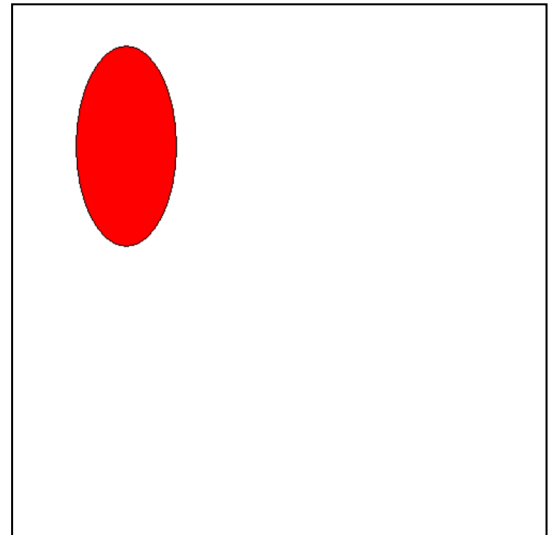
6. Programming

Write a function called `random_shape` that prompts the user for the name of a color and an x and y location and then draws a shape in that color at that location.

The function should create a 500 by 500 `drawing_panel` and choose randomly between drawing a filled oval and a filled rectangle. Whichever it chooses, that shape should also have a black border drawn around it. The shape's width should be a random amount between 50 and 100 and the height should be twice the width.

Example run (possible graphical output at right):

```
color? red
x? 60
y? 40
```



7. Programming

Write a function named `koala` that draws a koala face at a random location on a 500 by 500 `drawing_panel`. The entire face should always be visible on the canvas. It shouldn't ever be partway off.

The face is gray 100 pixels wide by 100 pixels tall.

The ears are also gray and each 50 wide by 60 tall. They are both 20 from the top. One is 20 from the left, the other 90 from the left.

The eyes are black and 10 wide by 10 tall. They are both located 70 from the top. One is 50 from the left, the other 100 from the left.

The nose is black, 20 wide and 40 tall. It is located 80 from the top and 70 from the left.

8. Programming

Write a function named `month_apart` prompts the user for two calendar dates. Each date consists of a month (1 through 12) and a day (1 through the number of days in that month [28-31]). Assume that all dates occur during the same year. The function prints whether the dates are at least a month apart.

For example, the following dates are all considered to be at least a month apart from 9/19 (September 19): 2/14, 7/25, 8/2, 8/19, 10/19, 10/20, and 11/5. The following dates are NOT at least a month apart from 9/19: 9/20, 9/28, 10/1, 10/15, and 10/18. Note that the first date could come before or after (or be the same as) the second date. Assume that all values typed in are valid.

Example call:

```
First month? 6
First day? 14
Second month? 9
Second day? 21
month apart
```

Results given the user input on the left:

User input of 6, 14, 9, 21 should print `month apart` because June 14 is at least a month before September 21
User input of 4, 5, 5, 15 should print `month apart` because April 5 is at least a month before May 15
User input of 4, 15, 5, 15 should print `month apart` because April 15 is at least a month before May 15
User input of 4, 16, 5, 15 should print `too soon` because April 16 isn't at least a month apart from May 15
User input of 6, 14, 6, 8 should print `too soon` because June 14 isn't at least a month apart from June 8
User input of 7, 7, 6, 8 should print `too soon` because July 7 isn't at least a month apart from June 8
User input of 7, 8, 6, 8 should print `month apart` because July 8 is at least a month after June 8
User input of 10, 14, 7, 15 should print `month apart` because October 14 is at least a month after July 15