

## CS 115 Sample Midterm Exam #1

### 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.)

$x = 100$

$y = 10$

$z = 3 + y$

$z = z + 7$

$x = x / 10$

$y = y + 2 - x$

**x** \_\_\_\_\_

**y** \_\_\_\_\_

**z** \_\_\_\_\_

## 2. Expressions

For each expression in the left-hand column, indicate its value in the right-hand column. Be sure to list a constant of appropriate type (e.g., 7.0 rather than 7 for a double, strings in quotes, true/false for a boolean).

**Expression**

**Value**

`5 * 6 - (4 + 3) * 2 - 2 * 3`

---

`208 // 20 // 4 + 1 / 10.0 + 0.4 * 2`

---

`8 - 2 + 8 // 2 + (8 - 2) + 8`

---

`4 * 5 % 6 + 297 % 10 + 4 % 8`

---

`13 // 2 * 3.0 + 5.5 * 3 // 2`

---

`4 - 13 % 2 + 2.0 - 6 % 22 // 3`

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### 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:
    b = b - 1
elif a < b:
    a = a + 1
else:
    b = b + 5
if a == b:
    a = a + 2
print(a, "-", b)
```

**User input**

14 12

4 5

10 5

2 8

**Value(s) Printed**

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#### 4. While Loop Mystery

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

```
x = int(input())
y = 1
z = 2
while x > z:
    if x % z == 0:
        x = x // z
        y = y + 1
    else:
        z = z + 1
print(y, z)
```

**User input**

2

5

9

12

**Value(s) Printed**

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## 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 = 1`

`y = 15`

`z = 14`

`b = True`

### Expression

`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`

`(z + x) == y or not b and x - y % z == 0`

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

### Result

---

---

---

---

---

---

---

---

---

---

## 6. Programming

Write a function named `grades` that prompts the user for the grades for their first three quizzes and then outputs their average score and which quiz the user scored the best on. Assume all quizzes are worth 10 points. If the user earned the same amount of points on multiple quizzes the first quiz should be output.

Your formatting must match the sample output shown below. Although, of course, the user may input different data.

Quiz 1 grade? 5

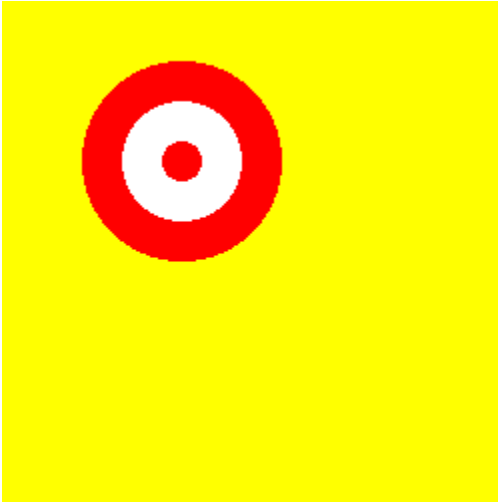
Quiz 2 grade? 10

Quiz 3 grade? 6

Average quiz grade: 7

Best quiz score: Quiz 2.

## 7. Programming



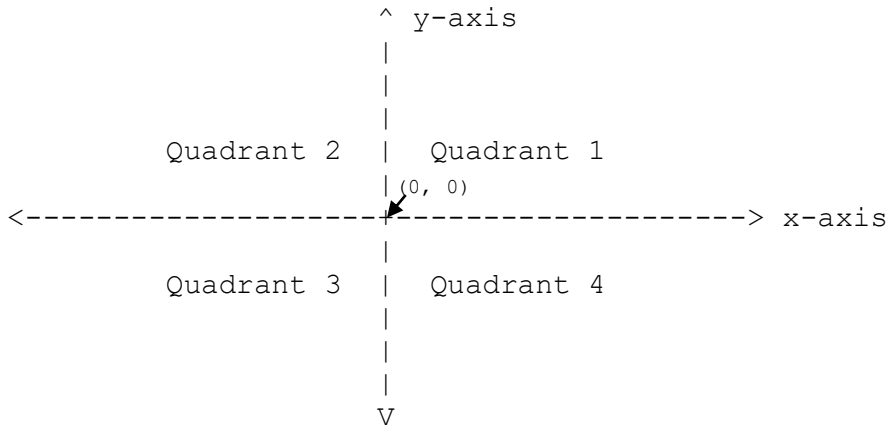
Write a function called `target` that prompts the user for an `x` and a `y` coordinate and then draws a red and white target on a yellow background.

The `drawing_panel` should be 250 by 250 pixels and the target's biggest red circle should be 100 wide by 100 tall at the read in `x`, `y` location. Centered inside it should be 60 by 60 white circle. Centered inside that should be a 20 by 20 red circle.

See an example to the left.

## 8. Programming

Write a function named `quadrant` that prompts the user for a pair of real numbers representing an  $(x, y)$  point and that prints the quadrant number for that point in the format shown below. Quadrants are numbered as integers, just as they usually are in math, from 1 to 4 with the upper-right Quadrant numbered 1 and the subsequent Quadrants numbered in a counter-clockwise fashion:



Notice that the quadrant is determined by whether the  $x$  and  $y$  coordinates are positive or negative numbers. If a point falls on the  $x$ -axis or the  $y$ -axis, print 0. Below are some sample calls. You must match the format of this example output exactly.

### Call

```
quadrant(12.4, 17.8)
```

### Output Printed

```
x? 12.4
y? 17.8
Point (12.4, 17.8) is in quadrant 1
```

```
quadrant(-2.3, 3.5)
```

```
x? -2.3
y? 3.5
Point (-2.3, 3.5) is in quadrant 2
```

```
quadrant(-15.2, -3.1)
```

```
x? -15.2
y? -3.1
Point (-15.2, -3.1) is in quadrant 3
```

```
quadrant(4.5, -42.0)
```

```
x? 4.5
y? -42.0
Point (4.5, -42.0) is in quadrant 4
```

```
quadrant(0.0, 3.14)
```

```
x? 0.0
y? 3.14
Point (0.0, 3.14) is in quadrant 0
```