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## 15-110 Fall 2018 Quiz 2

* 20 minutes
* No calculators, no notes, no books, no computers.
* Show your work when possible!

1. Code Tracing [15 pts]

Indicate what the following program prints. Place your answer (and nothing else) in the box.

```
def f(n):
    return n+5
def g(n):
    return 10*f(n) + f(n+2)
print(g(2))
```



## 2. Code Tracing [15 pts]

Indicate what the following program prints. Place your answer (and nothing else) in the box.

```
def f(a, b, c):
    result = 'A'
    if (a > b):
        result += 'B'
    elif (b > c):
        result += 'C'
        if (a > c):
            result += 'D'
    else:
        result += 'E'
    result += 'F'
    return result
print(f(1, 2, 3), f(2,3,1))
```

3. Short Answer [10 pts]

In the team-hw video we watched, Luis von Ahn explained that reCAPTCHA does two things -- not only does it confirm the user is a human, but it also does what? Keep your answer to 5 words or less.
4. Free Response: CS Academy Picture [ $\mathbf{3 0} \mathbf{~ p t s ]}$ : Write the 3 lines of Python that draw the picture on the left:


Some hints:

* There are only 3 shapes -- do not draw the outer rectangle (that is the $400 \times 400$ canvas)
* All numbers in your answer should be multiples of 100
* The only colors are 'black' and 'grey'

5. Free Response: donutBoxes(donuts, day) [ 30 pts]

On most days, a bakery sells donuts only in boxes of 5 . So if you want, say, 3 donuts, you still have to buy a box of 5 . On Saturdays and Sundays, though, they only use individual boxes, so if you want 3 donuts, you must buy 3 boxes, each with a single donut in it. With this in mind, write the function donutBoxes(donuts, day) that takes two values, the number of donuts to buy and the day as a three-letter string, and returns the fewest number of boxes you have to buy on that day to get that many donuts. For example:

```
assert(donutBoxes(5, 'Wed') == 1)
assert(donutBoxes(14, 'Mon') == 3)
assert(donutBoxes(14, 'Sat') == 14)
```

You may assume the day is a legal day (so, one of 'Mon', 'Tue', 'Wed', 'Thu', ...).
6. Bonus/Optional: Code Tracing [2.5 pts each]:

Indicate what each of the following programs prints. Clearly circle your answers (and nothing else).

```
# Bonus CT1:
def f(x, y): return x*y + y**x # Hint: bin(23)[2:] returns the string '10111',
def g(x, y): return f(x,f(y,x))
print(g(1,g(2,1)))
```

```
# Bonus CT2:
```


# Bonus CT2:

```
# and int('10111', 2) returns 23
```


# and int('10111', 2) returns 23

s = bin(int('1'*6, 2)//5-1)[2:]
s = bin(int('1'*6, 2)//5-1)[2:]
print(s, int(s,3))

```
print(s, int(s,3))
```

