

CSI 31 - Programming I. Final Exam. 05/24/2022.

Professor Luis Fernández. Time allowed: two hours.

NAME: _____

PART 1:

Write the answer to the following exercises. You may not use the computer in this part, but you can look at the book. Justify your answer briefly when indicated.

[5] 1. If `s` is a list, which of the following is the same as `s[0:-1]` ?

- a) `s[:]`
 - b) `s[-1]`
 - c) `s[:len(s)-1]`
 - d) `s[0:len(s)]`
 - e) `s[-1:]`
-

[5] 2. Taking the square root of a negative value with `math.sqrt` produces a

- a) `ValueError`
 - b) Imaginary number
 - c) `TypeError`
 - d) Program crash
-

[5] 3. Which expression is true approximately 66% of the time?

- a) `random() ≥ 66`
 - b) `random() < 66`
 - c) `random() > 0.66`
 - d) `random() ≤ 0.66`
 - e) `random() ≥ 0`
-

[5] 4. The term applied to hiding details inside class definitions is

- a) initializing
 - b) methods
 - c) subclassing
 - d) documentation
 - e) encapsulation
-

[5] 5. What would be the output when the following code is executed?

```
def sample(L, n):
    for word in L:
        for j in range(1,n):
            print(word*j)

A = ["How", "are", "you?"]
t = 3

sample(A, t)
```

[5] 6. What would be the output of the following program?

```
class Fish:
    def __init__(self, name, color, length):
        self.name = name
        self.color = color
        self.length = length

    def info(self):
        print(self.name, "is a fish.")
        print(self.name + "'s color is", self.color + ".")
        print("My fish is", self.length, "cm. long.")

ted = Fish("Ted", "gold", 3)
holly = Fish("Holly", "silver", 5)

print(holly.name)
ted.info()
```

[5] 7. Predict the output when the following code is executed:

```
x=19
y=7

while x > y:
    print(x, y)
    if x + y < 24:
        y = y + 5
    else:
        x = x - 2
```

PART 2:

Write the programs below using the following guidelines.

- Name each program “ex#.lastname” (a total of 3 files).
- Upload them into the folder Final Exam in Dropbox, found at this link:
<https://www.dropbox.com/request/rW8MNz8QIDbwQ4FzuLm5>
- Test your programs and make sure they work properly. Also, write comments!

- [25] **1.** Write a function `sumOfRec` that takes a list of numbers as input and returns the sum of the squares of the reciprocals of the numbers. Make sure to deal with the zeros in the list, as they will give errors when finding the reciprocal. Test your function with the list `[1,2,-2,0.5,0,0,1,5]`.

You can download a template from here: [ex1.txt](#)

- [25] **2.** Write the definition of a class named “Card” which creates a card from a standard deck of cards. This class should have the following methods: `__init__(self, rank, suit)`, `getRank(self)`, `getSuit(self)`, `printCard(self)`, `shuffle(self)`, and `cheat(self, rank, suit)`.

- The suits are: “Hearts”, “Diamonds”, “Clubs”, “Spades”.
- The ranks are: “Ace”, “1”, “2”, “3”, “4”, “5”, “6”, “7”, “8”, “9”, “10”, “Jack”, “Queen”, “King”.
- `getRank(self)` and `getSuit(self)` return the rank and the suit of the card, respectively.
- `printCard(self)` prints the information on the card, like “This card is the Ace of Spades.”
- `shuffle(self)` replaces the card by any card from the deck, chosen randomly.
- `cheat(self, rank, suit)` changes the rank and suit of the card to the input given in `cheat`.

The user should be able to do the following (also see template below):

```
c = Card("Ace", "Hearts")
```

```
c.printCard()
```

This card is the Ace of Hearts

```
c.shuffle()
```

```
c.printCard()
```

This card is the Jack of Clubs (this is an example; it could be anything).

```
c.cheat("Ace", "Spades")
```

```
c.printCard()
```

This card is the Ace of Spades

```
c.cheat("12", "Spades")
```

```
c.printCard()
```

Invalid card

You can download a template from here: [ex2.txt](#)

(Please turn over to see the last exercise.)

- [25] **3.** Write an interactive program that repeatedly asks the user to input a number until “Enter” is hit. Your program should create a file named “numbers.txt” where all the numbers are written one below the other, and the last line should display the sum of all the input, after the string “The sum of your numbers is ”. For example, if the user inputs 3, 5, 7, 10, -3, 5.2, then the file numbers.txt should contain:

3

5

7

10

-3

5.2

The sum of your numbers is 27.2

You can download a template from here: [ex3.txt](#)