

Homework 2

Deadline: February 16th, 2022 11:59PM EST

1 Without Coding

Problem 1 (7 points)

Rewrite this following "for" loop as a "while" loop:

```
for i in range(1, X+1):
    if X % i == 0:

        print(i)
```

[1]

Answer:

```
i=1
while i<X+1:
    if X%i==0:
        print(i)
    i=i+1
```

Problem 2 (7 points)

What is the output of the following code? Show your work, including how x, i, and j change as the code runs.

```
i = 0
j = 0
while i<10:
    for x in range(3):

        j+=2
        i+=1

    print(i,j)
```

[2]

Answer:

1. i and j are declared as 0 at the start of the code.
2. When x=0, j=2, i=1.
3. When x=1, j=4, i=2.
4. When x=2, j=6, i=3. The condition of the for loop has been reached, however i<10, so the

- while loop starts again.
5. When $x=0$, $j=8$, $i=4$.
 6. When $x=1$, $j=10$, $i=5$.
 7. When $x=2$, $j=12$, $i=6$. The condition of the for loop has been reached, however $i < 10$, so the while loop starts again.
 8. When $x=0$, $j=14$, $i=7$.
 9. When $x=1$, $j=16$, $i=8$.
 10. When $x=2$, $j=18$, $i=9$. The condition of the for loop has been reached, however $i < 10$, so the while loop starts again.
 11. When $x=0$, $j=20$, $i=10$.
 12. When $x=1$, $j=22$, $i=11$.
 13. When $x=2$, $j=24$, $i=12$. The condition of the for loop has been reached and the condition of the while loop is no longer true, therefore the while loop is exited.
 14. Output= 12,24

Problem 3 (10 points)

Briefly explain the following errors and an example that could cause them:

- **ZeroDivisionError**: This error occurs when we divide (or give the second argument of modulo) by 0.
- **TypeError**: This error happens when an incorrect operation is performed on an unsupported object type. An example of this error, would be using a "+" operator on a string and an integer.
- **NameError**: This error occurs when the identifier being accessed is not defined in the scope, working in. An example of this error would be using undefined variables or defining variables after usage.
- **SyntaxError**: This error is caused when the compiler can't understand our code, when translating our code into bytecode. An example would be forgetting a colon on the end of a def statement or misspelling.
- **IndexError**: This error occurs when our code is trying to access an invalid index. An example is when you are trying to access the 4th item of a list, that has 3 items.

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Problem 4 (6 points)

What is the value of lines 2, 4, 5, 6, 9, and 11? Assume the lines are executed in order and errors may occur (as if they are separate notebook cells).

1. `d = {'apples': 15, 'bananas': 35, 'grapes': 12}`
2. `d['banana']` → `KeyError`
3. `d['oranges']=20`
4. `len(d)` → 4

5. 'grapes' in d → True
6. d['pears'] → KeyError
7. fruits = list(d.keys())
8. sorted(fruits)
9. print(fruits) → ["apples", "bananas", "grapes", "oranges"]
10. del d['apples']
11. 'apples' in d → False