

1. Answer the following questions. Be concise and limit your response to 50 words.

(a) In Linux environment,

i. (1 point) what command is used to check the current working directory ?

Solution: pwd

ii. (1 point) what command is used to list files in the current working directory ?

Solution: ls

(b) (2 points) What is a variable ?

Solution: A variable is a memory location which contains a value and addressed with a symbolic name.

(c) (2 points) Which of the following are valid variable names in Python (circle the correct answer)?

✓ v3variable ☐ 5number ☐ even-number ☐ _sums() ✓ exactAmount54321
✓ COLLECTION ✓ NAME_ ✓ _int

(d) (2 points) What data types are available in Python ?

Solution: string, integer, float, boolean, tuple, list

(e) (2 points) List the sequence types in Python and briefly describe their difference (in terms of mutability and data types they can contain).

Solution: String is immutable sequence type which can contain only characters. Tuple is immutable sequence type which can contain any types. List is mutable sequence type which can contain any types.

(f) (2 points) Explain the usage of keywords **break** and **continue**.

Solution: **break** used to exit the current executing loop. **continue** is used to skip the remainder of the loop body.

2. (15 points) Evaluate each expression. Then give the result of the evaluation and the data type of the result. If the expression cannot be evaluated or it's not a proper Python expression, simply write "error" for the value.

Solution:

Expression	Value	Type
<code>5 + 1.0</code>	6.0	float
<code>6 - 3 / 2</code>	4.5	float
<code>4 * 3 % 2</code>	0	integer
<code>"Pie" ** 3</code>	Error	
<code>9 - 5 // 6</code>	9	integer
<code>"Python" + 5</code>	Error	
<code>2 ** 4.0</code>	16.0	float
<code>"NFL" + 'Pro'</code>	NFLPro	string
<code>str(6 // 5) + str(2 % 3)*3</code>	1222	string
<code>3 > 1/2 and 9/3.0 == 3)</code>	True	boolean
<code>4 > 5 or 5 < 4</code>	False	boolean
<code>not 2 * 3 and 2 > 3</code>	False	boolean
<code>"Python"[6]</code>	Error	
<code>2 != 1 or 2 > 1 and 2 < 1</code>	True	boolean
<code>(5, "5")[1]</code>	5	string

3. (10 points) Write down the output of each of the print statements below. If the statement would generate an error, simply write “error”.

```
word = "Emory" + '\tU'
```

```
print ( word.lower() + 'niversity')
```

Solution: emory university

```
print ( word [ 0:4 ] )
```

Solution: Emor

```
print ( word [ 2: ] )
```

Solution: ory U

```
print ( word [ :-2 ] )
```

Solution: Emory

```
print (word [ - len(word) ] )
```

Solution: E

4. (10 points) For the code below, the user will see a series of strings printed to the terminal. Write down these strings in the order they appear.

```
n = 2
k = 2
while n < 10:
    n = n + k
    k = k+1
    print(n)
    if n % 2 == 0:
        print( "+" )
    else:
        print( "-" )
    print(k)
print(n+k)
```

Solution:

```
4
+
3
7
-
4
11
-
5
16
```

5. A student wrote the following code to calculate the sum of non-negative even numbers less than the input number n . (lines are numbered for your convenience)

```
1:  n = int(input("Please input a number: "))
2:  evens = 0
3:  while n != 0:
4:      n = n - 2
5:      evens = evens + n
6:
7:  print ("The sum of even numbers is", evens)
```

- (a) (5 points) There are several problems with this code. Specifically, there is a syntax error and there is a logical error. Find those errors and explain why the code would get stuck if we give an input of 5. (feel free to refer to line numbers in the program above for easy reference.)

Solution: A. The first line is missing a closing parentheses.
B. If the input number is an odd number, the loop condition never evaluates to False and therefore the program would stuck in a dead-loop.

- (b) (5 points) Rewrite the code to fix the errors.

Solution:

```
1:  n = int(input("Please input a number: "))
2:  evens = 0
3:  if n % 2 == 1:
4:      n = n + 1
5:  while n > 0:
6:      n = n - 2
7:      evens = evens + n
8:
9:  print ("The sum of even numbers is", evens)
```

6. (4 points) Rewrite the following `while` loop with a `for` loop.

```
n = 1
while n <= 100:
    print (n)
    n = n + 1
```

Solution:

```
n = 1
for i in range(100):
    print (i+1)
```

7. (4 points) The variables `ta` and `tb` are tuples and they may have some elements in common. Your task is to write several lines of code which would print out the elements common to both tuples. For example, if

```
ta = ('a', 'b', 5, True, 2.7)
```

```
tb = ('b', True, 'c', 1.3, 5)
```

then your code should print out

```
b
```

```
True
```

Solution:

```
for i in ta:
    if i in tb:
        print (i)
```

8. (10 points) Write a Python program `mul.py` which takes a number n from the user and prints out n by n multiplication table. For example:

```
python3 mul.py
Please input a number:
4
Here is the multiplication table:
1 2 3 4
2 4 6 8
3 6 9 12
4 8 12 16
```

Solution:

```
n = int(input("Please input a number:\n"))

print("Here is the multiplication table:")

for i in range(1,n+1):
    for j in range(1,n+1):
        print(i*j, end=" ")
    print()
```