**Lab 0 -  Pre-lab**

This lab is designed to let you recall knowledge learned in your ITW 2430 as well as get familiar with the lab/project report format and online submission system of this course.

Try to write your answers first without run the code and then verify your answers by running the code. In case you made a mistake, make sure you know the reason.

This lab need to submit on time using the online submission system, but it will not be graded, check the answers yourself by running the code.

**Prob. 1. What is the type of each of the following expressions (within the type function)?**

Program Text: Output:

print(type(5)) \_\_\_\_<class ‘int’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type("abc")) \_<class ‘str’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(True)) \_\_<class ‘bool’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(5.5)) \_\_\_<class ‘float’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(12/27)) \_\_<class ‘float’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(12//27)) \_<class ‘int’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(2.0/1)) \_\_<class ‘float’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(2.0//1)) \_\_<class ‘float’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(12 \*\* 3)) \_\_<class ‘int’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(12.0\*\*3)) \_\_<class ‘float’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

print(type(5 == “5”)) \_\_\_<class ‘bool’>\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a = str((-4 + abs(-5) // 2 \*\* 3) + 321 - ((64 // 16) % 4) \*\* 2)

print(type(a))

print(a)

Output:

<class ‘str’>

317

a= str((-4 + abs(-5) / 2 \*\* 3) + 321 - ((64 / 16) % 4) \*\* 2)

print(type(a))

print(a)

Output:

<class ‘str’>

317.625

**Prob. 2 Consider the following code**

Program Text:

a = ?

if a > 10 and a % 6 = 3:

  print(“a”)

elif a > 10 and a < 20:

  print(“b”)

else:

  print(“c”)

Give a value for *a*that would produce the following outputs. If no value of *a*would produce that

output, write none.

Value of *a*: Output:

The code will not execute do to a syntax error

If a > 10 and a % 6 = 3: 🡸 a % 6 = 3 is an assignment statement and the ‘if’ check needs a Boolean check

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a b

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Python is fun!

**Prob. 3  What is the output of the following code? *If the code does not terminate, write error.***

Program Text:

a = 5

while a < 8:

  print("X")

Output:

Error, infinite loop

Program Text:

a = -1

while a < 3:

  print("X")

  a = a + 1

Output:

X

X

X

X

a = 1

while a % 7 != 0:

  if a % 2 == 0:

    print("O")

  if a == 2:

    print("X")

  a = a + 1

Output:

O

X

O

O

**Prob. 4 We’re going to show you variants of the same code. Write the output of each code snippet.**

Program Text:

keep\_going = True

a = 0

b = 0

while keep\_going:

  print("O")

  a = a + 5

  b = b + 7

  if a + b >= 24:

    keep\_going = False

Output:

O

O

We rearranged the code within the while loop here.

Program Text:

keep\_going = True

a = 0

b = 0

while keep\_going:

  print("O")

  if a + b >= 24:

    keep\_going = False

  a = a + 5

  b = b + 7

Output:

O

O

O

The remaining two variants are duplicates of the first two with >= replaced by >.

Program Text:

keep\_going = True

a = 0

b = 0

while keep\_going:

  print("O")

  a = a + 5

  b = b + 7

  if a + b > 24:

    keep\_going = False

Output:

O

O

O

Program Text:

keep\_going = True

a = 0

b = 0

while keep\_going:

  print("O")

  if a + b > 24:

    keep\_going = False

  a = a + 5

  b = b + 7

Output:

O

O

O

O

**Prob. 5 What is the output of the following code? *If the code does not terminate, write error.***

Program Text:

a = 0

while a < 3:

  while True:

    print("X")

    break

  print("O")

  a = a + 1

Output:

X

O

X

O

X

O

Program Text:

a = 1

while a < 3:

  while a < 3:

    print("O")

    a = a + 1

Output:

O

O

Program Text:

a = 1

while a < 3:

  if a % 2 == 0:

    b = 1

    while b < 3:

      print("X")

      b = b + 1

  print("O")

  a = a + 1

Output:

O

X

X

O

Program Text:

a = 1

while a < 3:

  b = 1

  while b < 3:

    if a == 2:

      print("X")

    print("O")

    b = b + 1

  print("O")

  a=a+1

Output:

O  
O  
O  
X  
O  
X  
O  
O

**Prob. 6  What is the output of the following code? *If the code does not terminate, write error.***

Program Text:

def f(a):

  a = a + 5

  return a

b = 0

f(b)

print(b)

b = f(b)

print(b)

Output:

0

5

Example for variable scope:

a =5

b=6

def max(a, b):

     if a>b:

        a=10

        return a

    else:

        return b

def max1(c, b):

     if c>b:

        a=10

        return c

    else:

        return b

print(max(7,6))

print(a)

print(max1(7,6))

print(a)

Output:

10

5

7

5