Previous ILP activities

Credits: C. Jegourel, SUTD

Week 1

1. Values and Data Types: What are the outputs of the following statements?

(a) print type("This is the first Week!")

(b) print "This is the first Week!"

(c) print type(24)

(d) print 24

(e) print type(2.4)

(f) print 2.4

(g) print type("24")

(h) print "24"

(i) print type(’2.4’)

(j) print type("""2.4""")

(k) print type(’’’2.4’’’)

(l) print 10300

(m) print 10,300

(n) print 10.300

(o) print type(10.300)

2. Type conversion: What are the outputs of the following statements?

(a) print int(1.1)

(b) print int(9.81)

(c) print int(-9.81)

(d) print int("9.81")

(e) print int("9.81m/s2")

(f) print float("9.81")

(g) print str(9.81)

(h) print type(str(9.81))

(i) print str(int(9.81))

(j) print type(str(int(9.81)))

3. Variables: Given a Python script as follows.

```
message = ”What ’s up , Doc ?”
n = 17
pi = 3.14159
pi = 3.1 4
print message
print n
print pi
```

(a) What is the value of pi at:

i. line 2

ii. line 3

iii. line 4

iv. line 5

(b) What is the type of:

i. variable message

ii. variable n

iii. variable pi

4. Variable Names: Check whether the following variable names are valid:
(a) 23days
(b) days23
(c) day 23
(d) mymoney2
(e) mymoney$
(f) myclass
(g) class
(h) my_grade
(i) my_grade_is_B+

5. Operators and Operands: What are the outputs of the following statements?
(a) print 5 + 3
(b) print 5 - 3
(c) print 5 * 3
(d) print 5 ** 3
(e) print 5 / 3
(f) print 5 // 3
(g) print 5 / 3.0
(h) print 5.0 / 3
(i) print 5 % 3

6. Operator Precedence: What are the outputs of the following expressions?
(a) 17-3*7/4+1
(b) 2**2**4*3

7. Updating Variables: Write the following code in a Python script file.
What are the outputs of the following code?

(a)

```
x = 3
print x
x = x + 2
print x
```

(b)

```
x = 3
print x
x -= 2
print x
```

(c)

```
x = 3
print x
x *= 2
print x
```

8. Write a program to accept a score from the user. If the score is above 90, print ”Excellent”; if the score is from 81 to 90, print ”Very good”; if the score is from 71 to 80, print ”Good”, if the score is from 61 to 70, print ”Fair”, else print ”Needs improvement”.

Week2

1. Look at the series of numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34,… and try to detect a pattern. Now write a program that accepts any integer n from the user, and prints the series up to n terms.
For example, if the user enters 5, the program should print 0, 1, 1, 2, 3 if the user enters 8, the program should print 0, 1, 1, 2, 3, 5, 8, 13.

2. Write a program that accepts any integer n from the user and prints the sum of integers from 1 to n. The program should not use any loops!

3. The least common multiple (LCM) of two integers a and b is the smallest positive integer that is divisible by both a and b. Write a Python program that accepts two integers from the user and computes their LCM.

4. Write a program to do the following:
(a) Accept a positive integer from the user.
(b) If n is even, divide it by 2 to get n=2. If n is odd, multiply it by 3 and add 1 to obtain 3n + 1.
© Repeat above step (b) until the result is 1.
Will the program terminate (that is, stop running) for any value of n?

Week 3

1. Write a program that takes a list of numbers and prints out another list that contains all even numbers in the original list.

2. Write a program that takes a list of numbers and prints out a new list which is the reverse of the original list. For example, if the input list is [5, -2, 15, 4] then the output list will be [4, 15, -2, 5]. Use loops and do not use any built-in function to reverse a list.

3. An n x m integer matrix can be represented by a nested list which is a list with n items each of which is a list of m integer items. Write a program that takes a matrix and prints out its transpose matrix (https://en.wikipedia.org/wiki/Transpose).
For example, if the input is:
a = [[1 ,2 ,3] , [4 ,5 ,6] , [7 ,8 ,9]]
The output will be:
[[1 ,4 ,7] , [2 ,5 ,8] , [3 ,6 ,9]]

4. Write a program that accepts an integer from the user and prints all prime numbers less than or equal to that integer.

5. Write a program that takes a list of integers and finds whether there is at least one duplicate of some integers.

6. Write a program that takes a list of lists, where each sublist contains numbers. The program should compute the average of each sublist and print a list whose elements are the averages of the sublists. For example, if the input is *[[3, 4], [5, 6, 7], [1, 2, 3]]* the program should print [3.5, 6.0, 1.333].