

## 22C:16 Practice Problem Set 1

Date: Feb 1st

These practice problems correspond roughly to the material covered by the end of the second week of classes (i.e., Jan 28th). Ideally, you should solve all of these problems away from a computer and then check your answers by typing in and executing programs.

- Some of the following expressions will evaluate correctly (i.e., without causing Python to produce an error message). For such expressions specify their type and value. For the remaining expressions, clearly specify what the error in the expression is.
  - `11 <= 2`
  - `"hello" + 10`
  - `str(10) + "10"`
  - `int(17/2.0)`
  - `893/5`
  - `78 != 65`
  - `3*math.sqrt(9)`
  - `float(1) + 1.5`
  - `int("337") + 200`
  - `float("300." + "100")`
- Consider the following Python program. Suppose that the user runs this program and when prompted, types 5 as input.

```
n = int(raw_input("Enter a number: "))
n = n + 10
n = n/3.0
n = int(n)
n = "n" + str(n)
n = n + "_hello"
n = 11
n = n % 2
```

Write down the value and type of `n` after each statement is executed.

- I want to write a program that takes as input a positive integer `n` and prints for each integer 1 through `n`, the square of that integer. For example, if `n` is 3, I would like the output to be:

```
The square of 1 is 1
The square of 2 is 4
The square of 3 is 9
```

Here are a few different attempts at writing this program. None of these attempts work – they all contain one or more errors. For each attempt, (i) identify the errors in that attempt and (ii) state the type of each error (syntax, run-time, or semantic). Finally, write down a completely correct program for the problem.

```
(a) n = int(raw_input("Enter a number: "))
    while count <= n:
        print "The square of", count, "is", count*count
        count = count + 1
```

```
(b) n = int(raw_input("Enter a number: "))
    count = 1
    while count <= n
        print "The square of", count, "is", count*count
        count = count + 1
```

```
(c) n = int(raw_input("Enter a number: "))
    count = 1
    while count <= n:
        print "The square of", count, "is", count*count
        count = count + 1
```

```
(d) n = int(raw_input("Enter a number: "))
    count = 1
    while count <= n:
        count = count + 1
        print "The square of", count, "is", count*count
```

```
(e) n = int(raw_input("Enter a number: "))
    count = 1
    while count <= n:
        print "The square of count is", count*count
        count = count + 1
```

4. For each program, make a table that shows that values of all the variables in the program at the beginning of each iteration of the `while`-loop (i.e., at the time the boolean expression in the `while`-statement is executed).

```
(a) n = 20
    while n > 0:
        n = n/3
```

```
(b) n = 10
    while n <= 15:
        n = n + 2
```

```
(c) n = 10
    m = 20
    while n <= m:
        n = n + 1
        m = m - 2
```

```
(d) n = 10
    while n%3 != 0:
        n = n + 1
```

5. For each of these programs, write down what the output will be.

```
(a) n = 10
    if n%3 != 0:
        print "Line 1", n
        print "Line 2", n
    else:
        print "Line 3", n
```

```
(b) n = 11
    if n < 2:
        n = n + 1
        print "Line 1", n
    else:
        print "Line 2", n
    print "Line 3", n
```

```
(c) n = 11
    if n < 11:
        n = n + 1
        print "Line 1", n
    else:
        n = n + 10
        print "Line 2", n
    print "Line 3", n
```

6. Write a program that prompts the user for an integer and outputs the absolute value of that integer. You can assume that the user will not input a non-integer.

7. Write a program that prompts the user for a sequence of positive integers and then outputs the number of even integers and the number of odd integers input by the user. The user will input 0 to indicate that she is finished inputting her sequence of positive integers. The 0 is not considered part of the sequence that your program needs to process. Here is an example interaction between the user and the program.

Enter a number: 7  
Enter a number: 9  
Enter a number: 90  
Enter a number: 3  
Enter a number: 0  
Even numbers: 1, Odd numbers: 3

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