

22C:16 Practice Problem Set 3

Morning Section: Complete before Tuesday, 2-12-2013

Evening Section: Complete before Monday, 2-11-2013

These practice problems correspond roughly to the material covered in the third week of classes (2-4 to 2-8).

1. Write down the boolean value that each of these expressions evaluates to. For expressions containing the variable `x`, assume that the value of `x` is 13.

- (a) `(10 != 200) and (True)`
- (b) `(not (x < 15)) or (x > 10)`
- (c) `not(not(x != 13))`
- (d) `(10 < 20) and ((20 < 30) or (20 != 20))`
- (e) `(x == 10) or ((x < 10) or (not (x > 20)))`

2. Look up the meaning of the following functions defined in the `math` module. You can find documentation for the `math` module at <http://docs.python.org/2/library/math.html> and after reading the documentation, you should also try playing with these in the Python shell.

- `ceil(x)`
- `factorial(x)`
- `floor(x)`
- `trunc(x)`
- `pow(x, y)`

Now we want you to be able to evaluate the following expressions away from the computer. Write down the value and type of each expression.

- (a) `math.ceil(5.75) - math.floor(5.75)`
- (b) `math.ceil(5) - math.floor(5.0)`
- (c) `math.trunc(10.5)/3`
- (d) `math.pow(2, 3) - math.pow(3, 2)`
- (e) `math.factorial(5)/10`
- (f) `math.ceil(math.sqrt(20))`
- (g) `math.floor(math.log10(50))`

3. What is the output produced by the following program?

```
n = 3
while n <= 5:
    m = n + 1
    while m <= 10:
        print m * n
        m = m + 3
    print "----"
    n = n + 1
```

4. What is the output produced by the following program?

```
n = 10
while n <= 100:
    print n
    n = n + 2
    if n % 10 == 0:
        n = n - 1
        break
    print n
```

5. Suppose we want to modify your solution to Problem 1 in Homework 1 so that the program aborts if the HOTPO process is taking too many steps. Specifically, modify your program so that if the number of steps in the HOTPO process exceeds 25, then the program stops executing the HOTPO process and simply outputs the message `HOTPO process aborted!`. Otherwise, if the process finishes in 25 or fewer steps, then the program should output (as in the solution to Problem 1 on the homework) the HOTPO length of the input number. We want you to solve this problem in two different ways:

- (a) By using the `break` statement.
 - (b) By using a boolean expression with a boolean operator (and, or, not) in the `while`-loop.
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