

22C:16 Practice Problem Set 1

Morning Section: Complete before Tuesday, 1-29-2013

Evening Section: Complete before Monday, 1-28-2013

These practice problems are based on the material covered in the lecture in first week (1/23-1/25) and assigned reading.

1. This is our first Python program, `intToBinary1.py`. Solve parts (a)-(d) first by hand, without executing the program.

```
n = int(raw_input("Type a nonnegative integer. "))

while n > 0:
    print n%2
    n = n/2
```

- (a) What output does the program produce for input 86?
 - (b) What output does the program produce for input 141?
 - (c) What output does the program produce for input 0?
 - (d) What output does the program produce for input -50? Explain in a sentence why your program behaves in this manner.
 - (e) Execute `intToBinary1.py` and when you are prompted "Enter a number", type `hello`. What happens? Explain in a sentence why your program behaves in this manner.
2. Consider the following program. Without executing on a computer, answer the following questions.

```
number = int(raw_input("Enter a number: "))
while number > 0:
    print number % 10
    number = number / 10
```

- (a) What output does it produce, given input 3179?
 - (b) Describe in one sentence, what the program does, in general.
3. Consider the following program. Without executing on a computer, answer the following questions.

```
number = int(raw_input("Enter a number: "))
count = 0
while count < number:
    print count*count
    count = count + 2
```

- (a) What output does it produce, given input 10?
- (b) Modify the program by swapping the two statements inside the body of the `while` loop. What output does it produce now, given input 10?
4. Consider the following program. The “!=” in the third line stands for “not equal to.” Without executing on a computer, answer the following questions.

```
number = int(raw_input("Enter a number: "))
count = 0
while count != number:
    print count
    count = count + 2
```

- (a) What output does it produce, given input 10?
- (b) What happens if the input is 9? Explain in 1-2 sentences. Use the back of the sheet, if necessary.
5. For each program below, 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
```

6. 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*. Your reading for the week contains an explanation of these three types of errors; this problem provides an opportunity to test your understanding of these ideas.

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
```