Problem set 5 Solutions

Problem 1: Small Matter of Programming

(a) Python program to print even numbers from 1 to 100

Lots of ways: explicit loops, testing for even, range(2,101,2), …

Some students used range(0, 100), which doesn’t include 100

One student wrote print(2,4,6, 8, 10…). Begrudgingly gave full credit to that…

(b) Count backwards from any number by sevens

Lots of ways. It should handle multiples of 7 and non-multiples. I think that the spec includes printing zero for multiples, but this might be ambiguous.

Mostly okay, but some students hard coded input values

(c) What does the Fortran program do?

Prints the minimum of x and y. In conversation, this seemed harder than it should have been.

Didn’t accept vague answers (-3 points)

(d) Python version of it

    If x > y:
    print y
    else:
    print x

Some confusion here — quite a few students printed the max!

Problem 2: Time to Get Moving

(a) What year does Unix time wraparound?

2038, if I remember right.

Some mistakes converting seconds to years

(b) What year does the time wraparound if stored unsigned?

2106
(c) Leftmost bit: 0 or 1?

0.
Main confusion would be thinking it’s a reference to rightmost bit

(d) What is 2,147,483,647 in hex?

7FFFF FFFF

(e) What is it in hex after incremented by 1?

8000 0000

Problem 3: Do I Know You From Somewhere

(a) Approximate dimensions of square?

If each person occupies 3 ft x 3 ft, it’s about 300 x 300 = 90,000 square feet. In previous years, there have been a lot of really improbable body dimensions; maybe a small ding or at least a warning for people who say things like they are 1 foot wide and 6 inches deep?

Lots of variability here, mainly around how tightly packed people are.

Took off points for assuming cubic dimensions (we cannot stack people!)

(b) Approximate fraction of a football field?

Anything consistent with part (a). It looks like 200% of the field.

(c) Approximate dimensions of square?

10,000 times as big

Gave full credit to anything where area was 10,000x area in a

(d) Approximate dimensions of square?

100 times in area.

(e) How many bits for id number?

19 bits (2**19 is about 512,000)
Some over-rounding to 20 or 18

(f) How many bytes?

3 bytes