CSCI 150: Exam 1 Practice

September 14, 2021

1. You are given

   ```
   a = 4
   b = 3
   c = 'test'
   d = 'fun'
   ```

   Evaluate the truth value of each Python expression below:

   - `False or b > a`

   - `(True and False) or (not False or False)`

   - `(a // b) > 1`

   - `((a * b) - 12) == 0`

2. Trace the execution of the following Python code, using the template provided on the next page.

   Showing your work (*e.g.* evaluation of expressions) is not required, but makes it much easier to give partial credit if you make a mistake.

```
i  = 3
animal  = 'cat'
if i < 1 or (animal == 'cat' and i > 1):
    i = i + 1
    animal = 'dog'
    first  = 'yay'
elif animal == 'dog' and i > 1:
    i = i + 1
    animal = 'pig'
    first  = 'boo'
if i > 5:
    i = i * 3
    second  = animal
else:
    i = i - 2
    second  = 'no'
```

3. Two trains a and b are on a collision course heading down the same track. If you know the speed of the two trains and how far apart they are, you can calculate when they will collide by the following formula:

$$collision = \frac{distance}{speed_a + speed_b}.$$

   Write a Python function, called `coll_time` that has three parameters, `d` which is the distance between them and `va` and `vb` which is are the speeds of the two trains. These should all be floats. This function should calculate how long before the trains collide using the above formula, and return the result.

   For example, you code should produce:

   `coll_time(100.0, 25.0, 75.0)` should return `1.0`

   `coll_time(50.0, 20.0, 5.0)` should return `2.0`

   `coll_time(100.0, 37.0, 25.0)` should return `1.6129032258064515`

4. Hal wants to write a function, called `alarm` that will tell him when to set his alarm clock. This function has two parameters, an integer variable for `day` according to 0=Sun, 1=Mon, 2=Tue, ..., 6=Sat, and a boolean variable `vacation` indicating if he is on vacation.

   The function should return a string of the form `7:00` indicating when the alarm clock should ring. Normally, on weekdays (Monday through Friday) the alarm should return `7:00` and on the weekend (Saturday or Sunday) it should return `10:00`. Unless he is on vacation—then on weekdays it should return `10:00` and weekends it should return `off`.

   For example:

   `alarm(3,False)` should return `'7:00'`

   `alarm(0,False)` should return `'10:00'`

   `alarm(4,True)` should return `'10:00'`

   `alarm(6,True)` should return `'off'`

5. European and American shoe sizes differ by a standard amount. You can approximate the European shoe size by using the following formulas.

   For men:

   $$euroSize = \frac{9}{7} americanSize + 30.5$$

   For women:

   $$euroSize = \frac{9}{7} americanSize + 29$$

   Write a function `size` that takes two parameters, a string `gender` which has value `'M'` for men and `'F'` for women and a float `s` for the American size and then returns the European shoe size using the above formula.

   For example:

   `size('M',11.5)` should return `45.285714285714285`

   `size('F',11.5)` should return `43.785714285714285`

   `size('F',6.0)` should return `36.714285714285715`