CS16 Section 1 Mini-Assignment

Due in your section the week of:

5/24 - 5/26

Please email your solution to your TAs BEFORE SECTION. The email subject should be:
<cslogin> Mini-Assignment Section <section number><time of section>

Modular Arithmetic

This activity introduces modular arithmetic in order to prepare you for next week’s hashing lecture. You may or may not already be familiar with modular arithmetic. The modulo operation, notated by \% or mod, is simply the remainder when dividing.

For example, suppose we have the equation:

\[ A \mod x \equiv R \]

also notated as

\[ A \equiv R \pmod{x} \]

This means that \( R \) is the remainder when you divide \( A \) by \( x \). It may be easier to think of it in terms of the equation:

\[ A = \text{some multiple of } x + \text{remainder } R \]

Here are a few examples:

5 mod 3 \equiv 2 (5 = 3 \ast k + 2, where \( k = 1 \)) or 2 is the remainder when you divide 5 by 3
10 mod 6 \equiv 4 (10 = 6 \ast k + 4, where \( k = 1 \)) or 4 is the remainder when you divide 10 by 6
15 mod 4 \equiv 3 (15 = 4 \ast k + 3, where \( k = 3 \)) or 3 is the remainder when you divide 15 by 4
99 mod 7 \equiv 1 (99 = 7 \ast k + 1, where \( k = 14 \)) or 1 is the remainder when you divide 99 by 7
200 mod 10 \equiv 0 (200 = 10 \ast k + 0, where \( k = 20 \)) or 0 is the remainder when you divide 200 by 10
934058 mod 59 \equiv 29 (934058 = 59 \ast k + 29, where \( k = 15831 \)) or 29 is the remainder when you divide 934058 by 59
52343450 mod 7 \equiv 5 (52343450 = 7 \ast k + 5, where \( k = 7477635 \)) or 5 is the remainder when you divide 52343450 by 7

Now it’s your turn!

60 mod 6 \equiv ______________ 
368 mod 13 \equiv ______________ 
4901 mod 172 \equiv ______________
Python Debugging

Here are some common Python bugs! See if you can find / fix all the errors in each block of code.

1. There are two errors in this block. Can you find them?
   
   ```python
   print "Hello World";
   ```

2. What does this print? How can you win?
   
   ```python
   if 5//2 == 2.5: (Note: this is integer division!)
       print("you won!")
   else:
       print("you lost :")
   ```

3. What does this print? Make it print 395!
   
   ```python
   firstNum = "345"
   secondNum = "50"
   sum = firstNum + secondNum
   ```

4. There are five errors in this block - what are they?
   
   ```python
   def relay_race(team):
       for athlete in len(team):
           print("Baton passed to next athlete!"")
       else:
           return null
   ```