CS16 Section 1 Mini-Assignment

Due in your section the week of:

2/4 - 2/8

Please bring a hard copy of your answers to section!

Modular Arithmetic

This activity introduces modular arithmetic in order to prepare you for next weeks 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:

$$A \bmod x \equiv R$$

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:

$5 \bmod 3 \equiv 2$ ($5 = 3 * k + 2$, where $k = 1$) or 2 is the remainder when you divide 5 by 3

$10 \bmod 6 \equiv 4$ ($10 = 6 * k + 4$, where $k = 1$) or 4 is the remainder when you divide 10 by 6

$15 \bmod 4 \equiv 3$ ($15 = 4 * k + 3$, where $k = 3$) or 3 is the remainder when you divide 15 by 4

$99 \bmod 7 \equiv 1$ ($99 = 7 * k + 1$, where $k = 14$) or 1 is the remainder when you divide 99 by 7

$200 \bmod 10 \equiv 0$ ($200 = 10 * k + 0$, where $k = 20$) or 0 is the remainder when you divide 200 by 10

$934058 \bmod 59 \equiv 29$ ($934058 = 59 * k + 29$, where $k = 15831$) or 29 is the remainder when you divide 934058 by 59

$52343450 \bmod 7 \equiv 5$ ($52343450 = 7 * k + 5$, where $k = 7477635$) or 5 is the remainder when you divide 52343450 by 7

Now it's your turn!

$60 \bmod 6 \equiv$ _____

$56 \bmod 7 \equiv$ _____

$368 \bmod 13 \equiv$ _____

$2196 \bmod 8 \equiv$ _____

$4901 \bmod 172 \equiv$ _____

$603920415 \bmod 36 \equiv$ _____