CISC-102 FALL 2016

HOMEWORK 7

Please work on these problems and be prepared to share your solutions with classmates in class next week. Assignments will **not** be collected for grading.

Readings

Read sections 11.8, 5.1, 5.2, 5.4, 5.5, 5.6 and 5.7 of *Schaum's Outline of Discrete Mathematics*.

Read section 2.4, 3.4 and 6.7 of *Discrete Mathematics Elementary and Beyond*.

Problems

(1) Prove that if $a \equiv b(\mod m)$ and $c \equiv d(\mod m)$ then $a - c \equiv b - d(\mod m)$.
(2) Write out each of the 5 residue classes mod 5 for integers in the range -10 to 10.
(3) A store selling menswear has, 3 kinds of jackets, 7 kinds of shirts, and 5 kinds of pants. How many choices are there for a single item? How many choices are there for one of each kind of clothing item.
(4) How many different strings can you make using the letters TIMBITS?
(5) From 100 used cars siting on a lot, 20 are to be selected for a test designed to check safety requirements. These 20 cars will be returned to the lot, and again 20 will be selected for testing for emission standards.
    (a) In how many ways can the cars be selected for safety requirement testing?
    (b) In how many ways can the cars be selected for emission standards testing?
    (c) In how many different ways can the cars be selected for both tests?
    (d) In how many ways can the cars be selected for both tests if exactly 5 cars must be tested for safety and emission?
(6) There are more than 230 students registered in CISC-102 this term. Prove that there is a month of the year in which at least 19 students in the class were born.
(7) How many binary strings of length 11 contain precisely 4 1s, and 7 0s? For example 00101010100 satisfies the requirement and so does 11110000000.
(8) You have 7 identical treats to distribute amongst 5 children.
    (a) In how many different ways can the treats be distributed?
    (b) In how many different ways can the treats be distributed if each child must get at least one.