## Homework 1 MACM 101-D1 September 10, 2019 Date due: September 18-19, 2019 in the Tutorial.

## 1 Practice Problems (Not to be handed in)

- 1. Problems (pages 11-14) 5, 23, 24, 29, 31, 34, 36
- 2. Problems (pages 24-26) 4, 8, 12, 17, 20, 22, 30

## 2 Homework Problems (To be handed in)

- 1. How many bit strings contain exactly five 0 and 14 1, if every 0 must be immediately followed by 2 successive 1.
- 2. Determine how many strings of n lowercase letters from the English alphabet contain
  - (a) the letter a.
  - (b) the letters a and b.
  - (c) the letters a and b in consecutive positions with a preceding b, with all letters of the string distinct.
  - (d) the letters a and b, where a is somewhere to the left of b in the string, with all letters distinct.
- 3. Five rooms of a house are to be painted in such a way that rooms with an interconnecting door have different colors. If there are *n* colors available, how many different color schemes are possible when the rooms in the house are arranged in the following way?
  - (a) Connected rooms form a linear order with one door interconnecting two adjacent rooms.
  - (b) Connected rooms form a linear order with one door interconnecting two adjacent rooms. The first and last rooms must be colored differently.
  - (c) Connected rooms form a circular order with one door interconnecting two adjacent rooms.
- 4. (a) How many terms are there in the expansion of  $(1 + x)^{25}$ ?
  - (b) Determine the coefficients of  $x^3$  and  $x^{10}$ .

(c) Determine the largest coefficient.