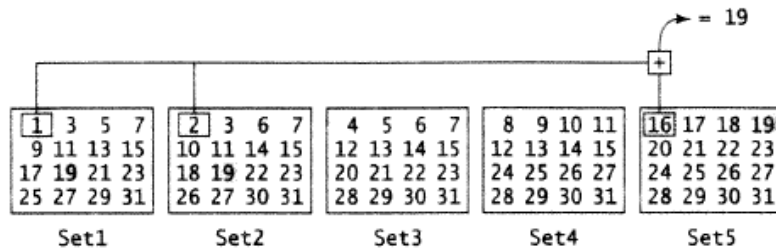# Discrete Math Programming Problem #1

3.4 Problem: Guessing Birth Dates

You can find out your friend's birth date in the month (1 to 31) by asking five questions. Each question asks whether the date is in one of five sets of numbers, as shown in Figure 3.2:

FIGURE 3.2 The birth date is the sum of the first numbers in the sets where the date appears.

The birth date is the sum of the first numbers in the sets where the date appears. For example, if the birth date is 19, it appears in Set1, Set3, and Set5. The first numbers in these three sets are 1, 2, and 16. Their sum is 19.

The way the numbers are grouped and placed in the five sets is deliberate. The starting numbers in each set are 1, 2, 4, 8, and 16, which correspond to 1, 10, 100, 1000, and 10000 in binary. If a date's binary number has a digit 1 in position k, the number should appear in Set$k$. For example, number 19 is binary 10011, so it appears in Set1, Set2, and Set5. It is binary $1 + 10 + 10000 = 10011$ or decimal $1 + 2 + 16 = 19$. Number 31 is binary 11111, so it appears in Set1, Set2, Set3, Set4, and Set5. It is binary $1 + 10 + 100 + 1000 + 10000 = 11111$ or decimal $1 + 2 + 4 + 8 + 16 = 31$.

The problem above was in a programming textbook. Read through it and understand how it works. You will adapt this strategy to write the program below.

Write a program to implement a game similar to the game above. Tell the user to think of a number between 1 and 50. "Guess" the number by asking the user to tell you if the number appears in sets of numbers you display. After you give the user the correct answer, ask if he wants to play again.

Turn in your source code and an exe file.

Grade criteria:

- Correctly guessing any number between 1 and 50.
- Nicely organized source code.
- Neat, efficient design.
- Nice user interface and clear directions.