Problem Set A: Sevens Elevens

In the game of SevenElevens, a player provides an initial bankroll and bets from this amount on each roll of the dice. On each roll, the sum of the faces is taken. The outcomes are as follow:

- If 7 or 11 is rolled, the player wins.
- If 2, 3, or 12 is rolled, the player loses.
- Otherwise, the number rolled becomes a player's point. The player rolls the dice repeatedly until the player wins by making a point (getting the same number as on the first roll) or loses everything by going out (getting a 7).

Design and implement a program that simulates a SevenElevens machine that allows the user to play SevenElevens. The program accepts an amount of money representing the initial bankroll. Before each game is played, the user must make a bet. At the end of the game, display the current amount of the user's bankroll.

Problem Set B: Marbles

The name of the game is Marbles. Two players alternately take marbles from a pile. In each move, a player chooses how many marbles to take. The player must take at least one but at most half of the marbles. Then the other player takes a turn. The player who takes the last marble loses.

Write a program in which the computer plays against a human opponent. Generate a random integer between 10 and 100 to denote the initial size of the pile. Generate a random value (either 0 or 1) to decide whether the computer plays *smart or stupid.* In stupid mode, the computer simply takes a random legal value (between 1 and n/2) from the pile whenever it has a turn. In smart mode the computer takes off enough marbles to make the size of the pile a power of two minus 1- that is, 3, 7,15, 31, or 63. That is always a legal move, except if the size of the pile is currently one less then a power of 2. In that case, the computer makes a random legal move.

Note that the computer cannot be beaten in smart mode when it has the first move, unless the pile size happens to be 15, 31, or 63. Of course, a human player who gets the first turn and knows the winning strategy can win against the computer.