/* craps.c: gather statistics about playing the game of craps.  Uses time() to initialize the random number generator.  Exact answers should be 49.28% and 50.71%  
   In casino craps, for a bet that a loss will occur (don't pass), an initial roll of 12 still loses for the pass better, but neither wins nor loses for the don't pass better.  Now the chance of winning with a bet on "don't pass" becomes the same as "pass".  Written by NR Wagner, March 7, 1996 */

#include <stdio.h>
#include <stdlib.h>
#include <time.h>
#define MAXR 1000000
#define WIN 1
#define LOSE 0

int die(void);
int roll(void);
int craps(void);

int main(void)
{
  int i;
  int wins = 0, loses = 0;
  srand48((long)time(NULL));
  printf("Total rolls: %1d\n", MAXR);
  for (i = 0; i < MAXR; i++) {
    if (craps() == WIN)
      wins++;
    else
      loses++;
  }
  printf("Wins:%.4f%, Loses:%.4f\n", 
         100.0*wins/MAXR, 100.0*loses/MAXR);
}

/* die: simulate rolling one die */
int die(void)
{
  return (int)(6.0*drand48() + 1.0);
}

/* roll: simulate rolling two dice */
int roll(void)
{
  return die() + die();
}

/* craps: play one game of craps */
int craps(void)
{
  int r;
  int point;
  r = roll();
  if (r == 2 || r == 3 || r == 12)
    return LOSE;
  if (r == 7 || r == 11)
    return WIN;
  point = r;
  for (;;)
    { 
      r = roll();
      if (r == point)
        return WIN;
      if (r == 7)
        return LOSE;
    }
}