CS 271 - Generating Random Numbers

Random number generation is covered in section 5.10 in the text.

rand function - no parameter, returns a random integer between 0 and RAND_MAX.

srand function - takes an unsigned int argument and seeds (sets a starting point for) the rand function. It is common to use the system time as a seed.

You'll need to include 2 libraries:

stdlib.h contains srand and rand functions

time.h contains the time function

Example Program 1 - use srand before the loop

```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>

int main (void) {

   // seed the random generator using the system time
   srand(time(NULL));

   int x, n;

   for (x = 1; x <= 10; x++) {
       // generate a random number between 1 and 6
       n = rand() % 6 + 1;
       printf("Dice Roll: %d\n", n);
   }
}
```

Output of this program

```
Run 1:
Dice Roll: 4
Dice Roll: 3
Dice Roll: 3
Dice Roll: 5
Dice Roll: 3
Dice Roll: 1
Dice Roll: 2
Dice Roll: 3
Dice Roll: 5
Dice Roll: 5

Run 2:
Dice Roll: 4
Dice Roll: 5
Dice Roll: 4
Dice Roll: 5
Dice Roll: 2
Dice Roll: 5
Dice Roll: 4
Dice Roll: 6
Dice Roll: 5
Dice Roll: 5
```

Looks random enough ☺

Program 2 - use srand inside the loop (This is the wrong way to do it.)

```
#include <stdio.h>
#include <stdlib.h>
#include <time.h>

int main (void) {

   int x, n;

   for (x = 1; x <= 10; x++) {
       srand(time(NULL));  X inside
       n = rand() % 6 + 1;
       printf("Dice Roll: %d\n", n);
   }
}
```

```
Run 1:
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
Dice Roll: 1
```

Yikes! Doesn't look random at all.

```
Run 2:
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
Dice Roll: 4
```