

CISC181 Introduction to Computer Science

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Lecture 7

September 22, 2009

3.8 Random Number Generation

- **rand** function (**<cstdlib>**)
 - **`i = rand();`**
 - Generates unsigned integer between 0 and **RAND_MAX** (usually 32767)
- Scaling and shifting
 - Modulus (remainder) operator: **%**
 - **`10 % 3`** is **1**
 - **`x % y`** is between **0** and **`y - 1`**
 - Example
 - **`i = rand() % 6 + 1;`**
 - “**`Rand() % 6`**” generates a number between **0** and **5** (scaling)
 - “**`+ 1`**” makes the range 1 to 6 (shift)
 - Next: program to roll dice



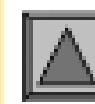


fig03_07.cpp
(1 of 2)

```
1 // Fig. 3.7: fig03_07.cpp
2 // Shifted, scaled integers produced by 1 + rand() % 6.
3 #include <iostream>
4
5 using std::cout;
6 using std::endl;
7
8 #include <iomanip>
9
10 using std::setw;
11
12 #include <cstdlib> // contains function prototype for rand
13
14 int main()
15 {
16     // loop 20 times
17     for ( int counter = 1; counter <= 20; counter++ )
18
19         // pick random number from 1 to 6 and output it
20         cout << setw( 10 ) << ( 1 + rand() % 6 );
21
22         // if counter divisible by 5, begin new line of output
23         if ( counter % 5 == 0 )
24             cout << endl;
25
26     } // end for structure
```

Output of `rand()` scaled and shifted to be a number between 1 and 6.