

Random Numbers

C and C++, as well as most all programming languages, have the capability to generate random numbers. These random numbers are generated by the use of mathematical formulas that will generate random numbers. These formulas almost always have a starting number or “Seed” which is used as the first number. When a new random number is generated this number is then fed into the formula to help generate the next random number, and the process will continue.

By the use of this method the random numbers are actually pseudo-random. That is the numbers are random between themselves in a single program run, but when the program is halted and rerun, then the same sequence of random numbers will be generated. This will occur every time because the starting “Seed” is always the same. To change the sequence of random numbers, just change the starting “Seed” to a different number.

C and C++ have two functions, both found in the header file “stdlib.h”, which are used for random numbers. Their prototypes and remarks are given below:

int rand(void); //Generates a pseudo-random number.

Return Value: **rand** returns a pseudo-random number, as described above.

Remarks:

The **rand** function returns a pseudo-random integer in the range 0 to **RAND_MAX**, which has a value normally of 32,767. Use the **srand** function to seed the pseudo-random-number generator before calling **rand**.

void srand(unsigned int seed); //Sets a random starting point for random formula

Parameters: *seed* //Seed for random-number generation

Remarks:

The **srand** function sets the starting point for generating a series of pseudo-random integers. To reinitialize the generator, use 1 as the *seed* argument. Any other value for *seed* sets the generator to a random starting point. **rand** retrieves the pseudo-random numbers that are generated.

Calling **rand** before any call to **srand** generates the same sequence as calling **srand** with *seed* passed as 1.

time_t time(time_t *timer); //Get the system time.

Parameters: *timer* //Pointer to the storage location for time.

Return Value: Return the time in elapsed seconds. A call to **time** can fail, however, if the date passed to the function is: Before midnight, January 1, 1970.

Remarks:

The **time** function returns the number of seconds elapsed since midnight (00:00:00), January 1, 1970, coordinated universal time (UTC), according to the system clock. The return value is stored in the location given by *timer*. This parameter may be **NULL**, in which case the return value is not stored.