

C Programming Language: On Line Test (60 minutes)

1. [50] (a) Write a program that can generate 10000 random integer numbers and count and output how many one's in bit i ($i = 0$ to 31) for these 10000 random integers. (b) Write a new random number generator *long_rand()* to generate a random long integer and then write *main()* to call *long_rand()* to generate and output 100 random long integers.

2. [50] Write two versions of the function that compute f defined as follows:
 $f(0) = 0$, $f(1) = 1$, $f(2) = 1$, and $f(i) = f(i-1) + f(i-2) + f(i-3)$ for $i \geq 0$,
(1) purely recursive.
(2) iterative for loop.
Use the main program to print out $f(8)$ to $f(12)$ by using (1) and (2).