

**BIL 105E - Introduction to Scientific
and Engineering Computing (C)
Spring 2015-2016**

Homework 2 Report

Assignment Date: 27.03.2016

Due Date: 11.04.2016, 23:00

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Introduction:

As stated in description of homework, we are wanted to write some functions called by reference. This functions generate random numbers using different algorithms. Also this homework aims to consolidate the usage of pointers and improve programming skills.

Development Environment:

My project includes 1 C file, named 150140032.c and 1 executable file, named 150140032. I wrote my code Atom editor on Mac OS, and compile it with GCC compiler in two different platforms (Mac OS and Linux). My command that I used to compile is

```
"gcc -lm 150140032.c -o 150140032".
```

Variables:

range1, range2, range3, range4, range5 are used for ranges of histogram
algo, num_samples, seed are used to store user inputs.
percent and number are used to store some calculations

*Detailed information is in comment lines of the source code and the flowchart at next page.

Used Funtions:

int digits(long number) is used to determine number of digits
void mid_rng(long *seed) is used to generate random numbers
void lsd_rng(long *seed) is used to generate random numbers
void take_samples() is used to take samples
void print_histogram() is used to print percentiges

Conclusion:

This was a beneficial homework that improved my programming skills. I fully understood the usage of pointers. Actually, these were things I already knew, but still it was fun to do it. The only challenging thing about this homework was writing the report.

```

int function digits {
    If number is zero
        return 0;
    return 1 + digits(number / 10);
}

void function lsd_rng {
    multiply the seed with 73 ;
    get the last 5 digits using mod operator;

}

void function mid_rng {
    take the square of the seed;
    d = number of digits in seed and calculated by
    digits function;

    divisor = 10 ^ ((d/2)-2);
    if d is greater than 5{
        divide the seed by divisor;
    }
    Get the last 5 digits using mod operator;
}

void function take_samples {
    for (i = 0; i < num_samples; ++i){

        If algo is 1

            Call mid function by reference;

        Else

            Call lsd function by reference;

        Set number to 1 plus modulo 500 of seed;

        Increase the corresponding range;

    }

    print "$ \(num_samples) random numbers were
    generated by using \(algorithm name):\n",
}

```

```
void function print_historgram {  
    for every range {  
        calculate the percentige;  
        print percentige with stars;  
    }  
  
int function print_main {  
    read the inputs with scanf;  
    call the take_samples function;  
    call the print_histogram funtions;  
    return 0;  
}
```