You have to use Linux ! You will find include files in /usr/include/ Manuals for the functions are available. Use the command man e.g. man 3 localtime.

You should use the following functions:

time.h : time(), localtime()
sys/time.h: gettimeofday()
unistd.h: sleep(), usleep()

1. Implement a C-program, which calculates the time between two times pressing the enter key. The measured time should include milliseconds. You have to use the function gettimeofday().

2. Implement a program, which outputs the actual time (including milliseconds) first every second, than every half second, 250ms, 50ms, 1ms. The program should have 7 iterations for each delay. You have to use the functions usleep(), gettimeofday() and localtime().

3. Implement a program, which calculates the time for 40 000 000 additions. You can use the function developed in task 1. Execute the program several times !

a) add 5 Integer numbers
b) add 5 floating point numbers
Don't use constants, these are eliminated by the compiler optimization !

4. You have two different functions (simple_func() and complex_func()). These two functions are called by a main program. The main program utilizes a random generator to choose one of the functions.

a) Complete the program by adding a time measurement (task 1). The program should measure the time for 300000 iterations. The code using the random generator generates a 50 percent chance. The result is the average execution time for 50%.
b) Modify the program to calculate the minimal execution time (simple function).
c) Modify the program to calculate the maximal execution time (complex function).
d) Modify the program to calculate the average execution time for a 40 percent chance for the simple function.

```
int complex_func ( int in)
{
int tmp1 ,i;
float tmp2 , tmp3 ;
for (i =0; i < 4321; i ++)
{
tmp1 = in*in*i;
tmp2 = (in+i )*( in+i )*( in+i);
tmp3 = tmp2 / tmp1 ;
}
return tmp3 ;
}
```

```
int simple_func ( int in)
{
int i,j=in;
for (i =0; i < 876; i ++) j = j+i;
return j;
}
main ( int argc , char ** argv )
{
int i,j;
<your code >
for (i = 0; i < 250000; i ++)
if ((j = rand (0)) >0 x3fffffff )
complex_func (j);
else simple_func (j);
<your code >
```