

COMPUTER SCIENCE I

Exercise 4

1. Write a program which prints a information on the screen when variables a and b fulfills the condition $a \in (-\infty;0) \cup (10;+\infty)$ and $b \in (0;+\infty)$. Check if the following code is working and apply modification if necessary:

```
int a = -1;
int b = -1;
if ( a < 0 || a > 10 && b > 0 )
{
    printf( "something\n" );
}
```

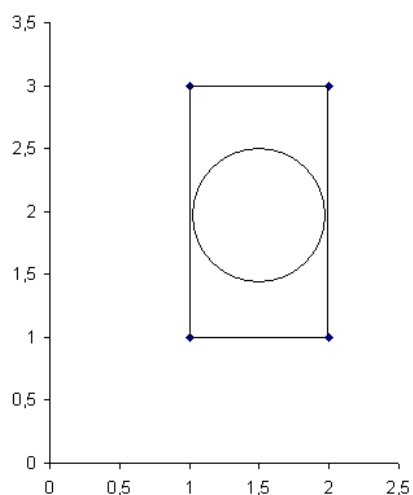
2. Write a program which generates random 2D points. The points should lay inside a rectangle shown on the figure. Keep on generating points until there will be n points laying inside a circle placed inside the rectangle. Coordinates of the rectangle and the circle should hardcoded (do not read them from keyboard) and value of n should be read from a keyboard.

Use rand function for generating random numbers. The function returns a pseudorandom integer in the range 0 to RAND_MAX. In order to get values in the range (v_min, v_max) use a scaling:

$$v = \text{rand}() * (v_max - v_min) / (\text{double})\text{RAND_MAX} + v_min$$

Pseudorandom numbers means that every time the generator is started it will produce the same series of numbers. To improve that behavior every time the generator is started it should initialized with different value. It can be done with srand function which is called once at the beginning of the program:

```
srand( (unsigned) time( NULL ) );
```



Execute program for n = 7.

3. Modify program above in such a way that coordinates of the points will be written to a file. Coordinates of points laying inside the circle and outside the circle should be written in different columns. Writing data to the file can be done as follows:

```
FILE* f; // declaration of a pointer to a file
f = fopen( "data.dat", "wt" ); // open the file with name „data.dat”
// w – write
// r – read
// a – append
// t – text file
// b – binary file
if( f == NULL ) // you can use also: if( !f )
{
    printf( "error\n" );
    exit(-1); // exit the program
}
fprintf( f, "write to the file" ); // here place the code to write your data
fclose( f ); // close the file
```

Show the results using point graph from the Excel. Use different color for points laying inside the circle. Do this for $n = 7, 50$ i 500 .