Homework 1 **Due:03/04/2023**

Q1 [60p] Write a function named `void generateSine()` that produces the pattern shown in Figure 1 and Figure 2. Hard coding is not allowed, you can only use `for` loops, `if` blocks, `M_PI`, `printf` and sine related functions from the `math.h` library. The sine wave is $sin(t)$ and is printed to the console with `printf("*");`. The height is `2HEIGHT+1` and the width is `WIDTH`. The width may not be used completely.

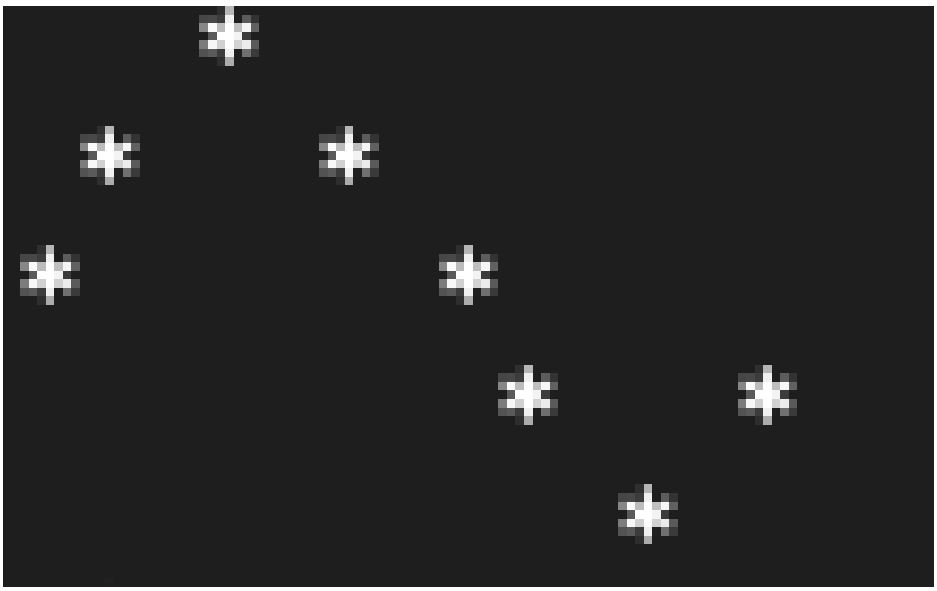

Figure 1: Results of Q1 for #define WIDTH 14 and #define HEIGHT 2

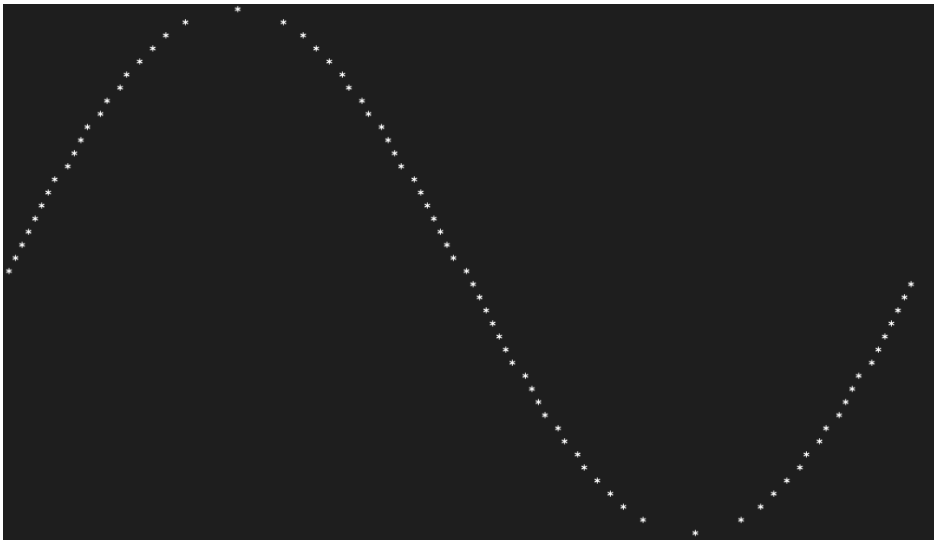

Figure 2: Results of Q1 for #define WIDTH 140 and #define HEIGHT 20

Q2 [40p] Implement the function `line_segment_distance` which calculates the shortest distance from point C to the line segment AB. The function takes first the coordinates of point A, secondly the coordinates of point B and lastly the coordinates of point C.

- Submit a single `*.c` file to NINOVA. Other file types will not be accepted nor graded.
- The given main function is not going to be submitted, only the necessary implementation needs to be submitted.
- Your submission will be compiled with a tester `main.c` file. Your code needs to compile without error, or your grade will be zero.
- Each functionality will be tested and added to your grade.
- Late submissions will be deduced 10p for each day late.
- Cheating is not allowed, once cheating is detected all involved submissions will be graded zero.

```c
//****************************************
//** DO NOT SUBMIT THIS FILE
//****************************************
#include <stdio.h>
#include <math.h>

/*   Q1 */
void generateSine();

/*   Q2 */
double line_segment_distance(int x1,int y1,int x2,int y2,int
   x3,int y3);

int main()
{
    /*   Q1 */
    // some code to test the function(s)
    generateSine();

    /*   Q2 */
    // some code to test the function(s)

    //first edge coordinates of a line segment in form x,y : 2,3
    //second edge coordinates of a line segment in form x,y : 5,5
    //point coordinates in form x,y : 1,2
    double dist=line_segment_distance(0,4,3,0,3,4);
    printf("distance:%lf\n",dist);
    // this printfs 2.4

    return 0;
}
```

deliverables/main.c

```c
//****************************************
//** SUBMIT ONLY THIS FILE
//** DO NOT CHANGE ANYTHING
//** ONLY ADD THE IMPLEMENTATION
//****************************************
#include <stdio.h>
#include <math.h>

//****************** Q1 ******************
#define WIDTH 14
#define HEIGHT 2

void generateSine()
{
    //implementation goes here
}

//****************** Q2 ******************
double line_segment_distance(int x1,int y1,int x2,int y2,int
   x3,int y3)
{
    //implementation goes here
}
```

deliverables/student.c