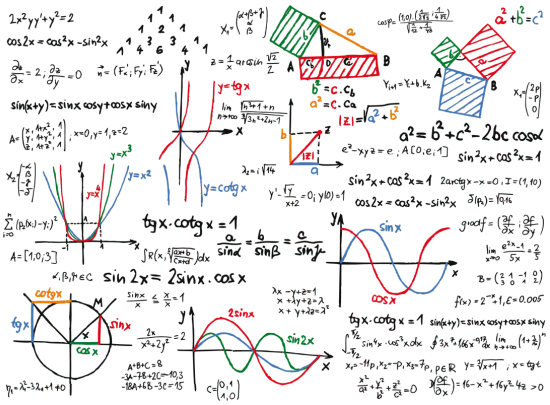
B5 - Mathematics

B-MAT-500

309pollution

Extrapolation and Pollution



309pollution

binary name:	309pollution
repository name:	309pollution_*$ACADEMIC_YEAR*
repository rights:	ramassage-tek
language:	everything working on "the dump"
compilation:	when necessary, via Makefile, including re, clean and fclean rules

- Your repository must contain the totality of your source files, but no useless files (binary, temp files, obj files,...).
- All the bonus files (including a potential specific Makefile) should be in a directory named *bonus*.
- Error messages have to be written on the error output, and the program should then exit with the 84 error code (0 if there is no error).

The ambient air quality monitoring in France is ensured by independent associations, members of the ATMO federation, and, on behalf of the State and public authorities, are responsible for implementing means of monitoring.

Why not you? The Lozère market seems easily open for the taking…

So, you decide to start a project based on collaborative initiatives like CitoyensCapteurs in order to acquire data. All that's left to do is to create a little software for viewing the data…

You receive the data in triplets (x, y, p) where x and y are the coordinates (presumably integers so it's simpler) on a normal grid and p the pollution level (in percentage). We will consider that the pollution is non-existent on the grid's other points.

Your program will use Bézier surfaces to smooth out the data and display the value of the pollution level in a point inside the observed area.

Usage

Terminal

```
~/B-MAT-500> ./309pollution -h
USAGE
    ./309pollution n file x y
DESCRIPTION
    n       number of points on the grid axis
    file    csv file containing the data points x;y;p
    x       abscissa of the point whose pollution level we want to know
    y       ordinate of the point whose pollution level we want to know
```

Obviously libraries handling Bézier curves and surface are unauthorized…

Suggested Bonus

- A 3D grahical display,
- A real-time display system,
- NURBS surfaces.

EXAMPLES

```
Terminal
~/B-MAT-500> cat file.csv
0;0;20
0;1;12
1;0;50
1;1;30
1;2;50
2;2;80
```

```
Terminal
~/B-MAT-500> ./309pollution 3 file.csv 0 2
0.00
```

```
Terminal
~/B-MAT-500> ./309pollution 3 file.csv 0.6 2
28.20
```

```
Terminal
~/B-MAT-500> ./309pollution 3 file.csv 1.3 2
56.55
```

```
Terminal
~/B-MAT-500> ./309pollution 3 file.csv 1 1.5
33.94
```

```
Terminal
~/B-MAT-500> ./309pollution 3 file.csv 0.8 0.8
26.11
```