

## 1. Closest star.

Create a struct Star defined only by its position - coordinates in 3D space. Given a text file describing a bunch of stars, read coordinates about each one, find the closest one to us (the center of the coordinate system) and write a message containing the coordinates of the closest star at the end of the file. The given file will be in the following format: the first line contains the number of stars ( $n$ ), the following  $n$  lines contain the position of each star - 3 coordinates per line. The name of the file should be read from the console and will not be longer than 31 symbols.

The input file will not contain more than 64 stars. The output should be appended to the end of the file and the distance should be rounded to two decimal points.

Example input file:

```
6
2.13 3.64 4.97
4.22 7.69 1.03
8.76 2.00 3.12
0.21 9.18 2.85
4.39 0.15 3.92
5.29 1.11 9.73
```

Example output message:

```
The closest star to us is located
at (4.39, 0.15, 3.92) that is
11.13 lightyears away.
```

## 2. Storing spacecrafts.

You've just landed a job at NASA, you are given a list of spacecrafts and you're asked to create a database to store information about all the spacecrafts. Since databases are a little too complicated, you've decided to store the information in a binary file.

The list of spacecrafts will be given to you in a text file. Each line in the file will contain the launch year and the name of the spacecraft. Create a binary file, store all of the spacecrafts, after that read the binary file, load all the spacecrafts into memory and print them out to the console.

Example input file:

```
1961 Vostok 1
1969 Apollo 11
1998 ISS
2012 SpaceX Dragon
2003 Mars Express
1990 Hubble telescope
1977 Voyager 1
```

## 3. Първо контролно 2022/2023г.

Даден е двоичен файл с име input-points.dat, в който последователно са записани данни за точки в равнината. Всяка точка се характеризира със своите координати, описани с 2 реални числа (float). Намерете центъра на тежестта на всички точки и изведете на стандартния изход 3-те най-отдалечени от него. Прочетете от стандартния вход реално число  $R$ . Намерете всички точки от файла, които лежат извън кръга, описан с намерения център на тежестта и радиус  $R$ , и ги заменете с точка с

координати този център. Изведете съдържанието на файла `input-points.dat` на стандартния изход.