Laboratory work #1

Work with databases. Data output from the database in the form of tables.

Requirements:
- Implement a database of at least five linked tables.
- Fill in the database (you can choose the data source yourself).
- Extract data from tables by parameters.

General requirements:
- The application must have a graphical interface.
- You can use third-party libraries.

Laboratory work #2

Present the data from the database selected by parameters in different ways.

Requirements:
- To use the results of laboratory work #1.
- Check the selected data for normality using graphical methods, namely:
  - Build a distribution histogram.
  - Build a graph of quantiles.
- Visualize the correlation matrix by the selected data arrays, indicating numerical values in different colors.

General Requirements:
- The application must have a graphical interface.
- It is possible to use third-party libraries.

Laboratory work #3

Present the data from the database selected by parameters in different ways.

Requirements:
- To use the results of laboratory work #1.
- Approximate the selected data by polynomials of the first, second, third, fourth and fifth orders.

- There should be a legend on the graph describing the presented results, axes must be signed.
- Make a short-term forecast on the obtained models.

General requirements:
- The application must have a graphical interface.
- It is possible to use third-party libraries.

Laboratory work #4

Present the data from the database selected by parameters in different ways.

Requirements:
- To use the results of laboratory work #1.
- Apply the K-means method to the selected data.
- There should be a legend on the graph describing the presented results, axes must be signed.

General Requirements:
- The application must have a graphical interface.
- It is possible to use third-party libraries.

Course work:

Develop and implement an automated information system. Take data from NetCDF files (https://ru.wikipedia.org/wiki/NetCDF)

Requirements:
- A file with the extension *.nc (NetCDF), can be downloaded by selecting one of the datasets from the link:
  https://cds.climate.copernicus.eu/cdsapp#!/search?type=dataset
- Data from the NetCDF file should be written to the database (you should get 5 linked tables: latitude, longitude, month, year and temperature).
- Extract data from the database by parameters (for example, for a specific time period).
- The data to be extracted must be displayed on the map by selecting the data by location or by value.
- Check the distribution of parameters for normality by graphical methods, namely:
  - Build a histogram of the distribution.

- ➤ Build a graph of quantiles.
- Visualize the correlation matrix by selected data sets, indicating numerical values in different colors.
- Build a forecast model for air temperature, choose the method of building the model at your discretion.
- There should be a legend on the graphs describing the presented results, axes must be signed.

General requirements:
- The application must have a graphical interface.
- You can use third-party libraries.
- For a better understanding of how the NetCDF file works, you can use the Panoply program (https://www.giss.nasa.gov/tools/panoply/download/)