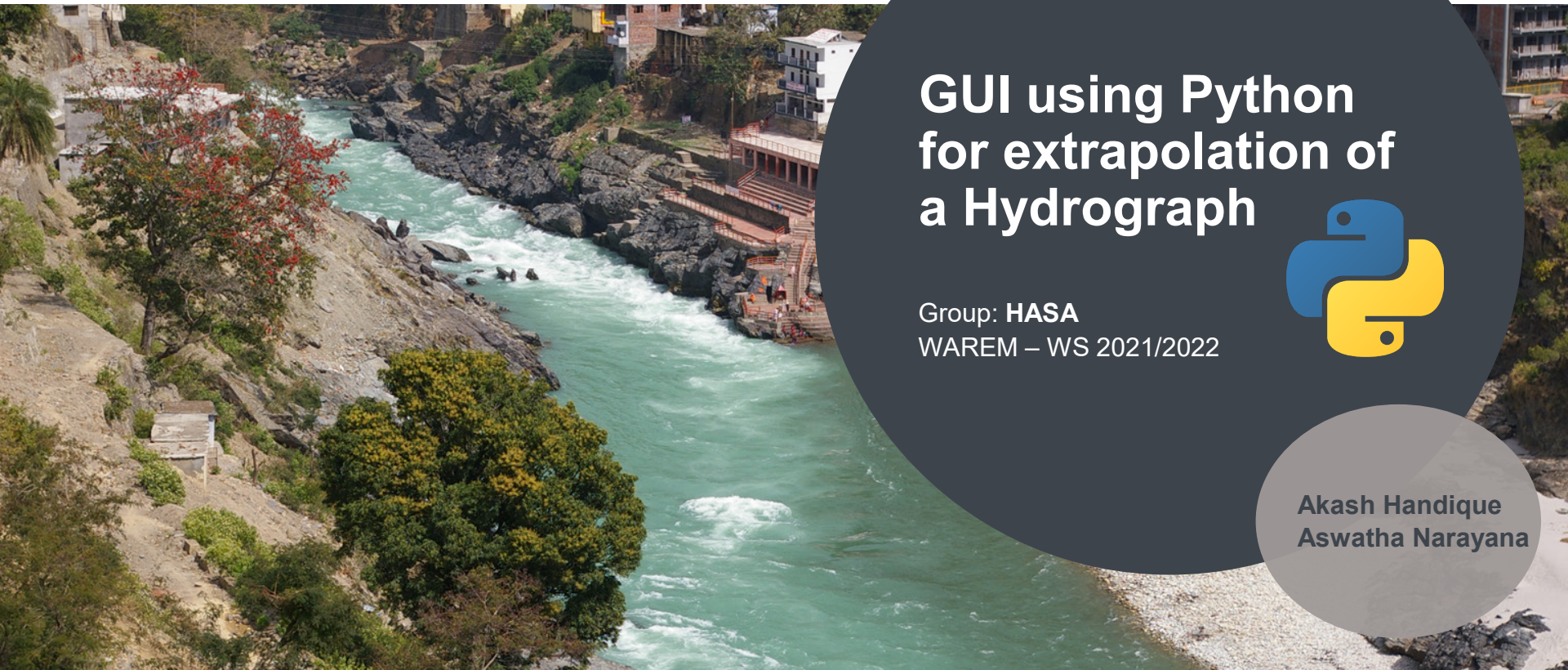
University of Stuttgart
Germany



GUI using Python for extrapolation of a Hydrograph

Group: **HASA**
WAREM – WS 2021/2022

Akash Handique
Aswatha Narayana

Introduction to the Project idea

Retrieval of Discharge data from Gauging stations (e.g., from Neckar River BW, Germany)

Sorting and Analyzing the data in hand and plotting the Hydrograph

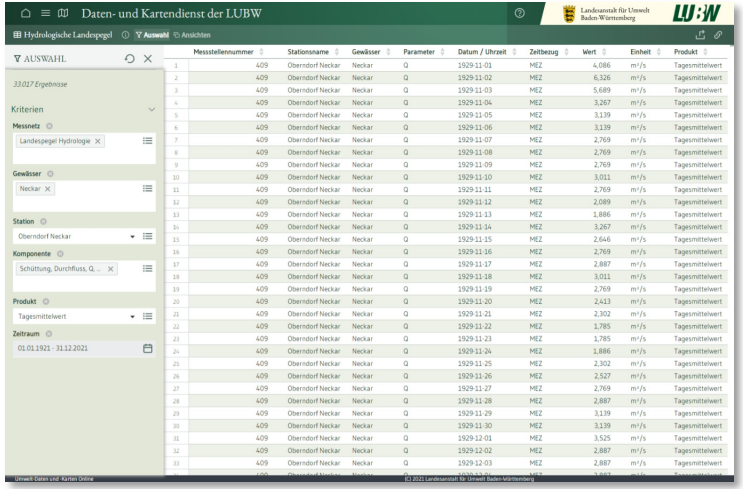
To extrapolate return periods beyond the length of the observation period using Gumbel distributed-extrapolation as the prediction model

Extrapolating for flood events such as 50-, 100-, 200-, 500-, and 1000-year floods

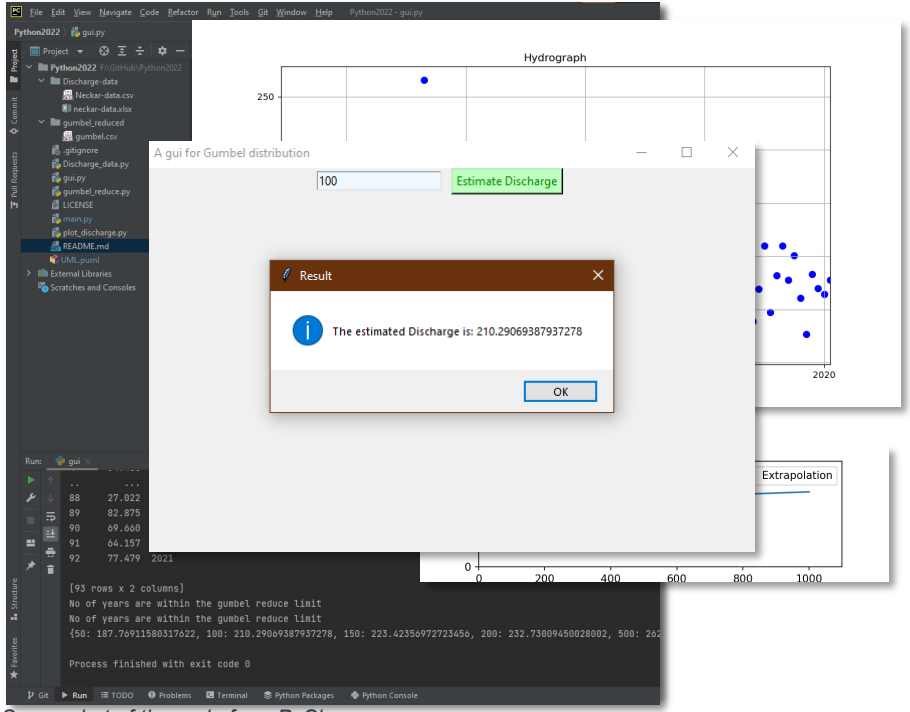
Designing a GUI for the prediction model to display the results

Introduction to the Project idea

Current status



https://udo.lubw.baden-wuerttemberg.de/public/q/3MD4H4f2pqsu7JaXsrmIRA



Screenshot of the code from PyCharm

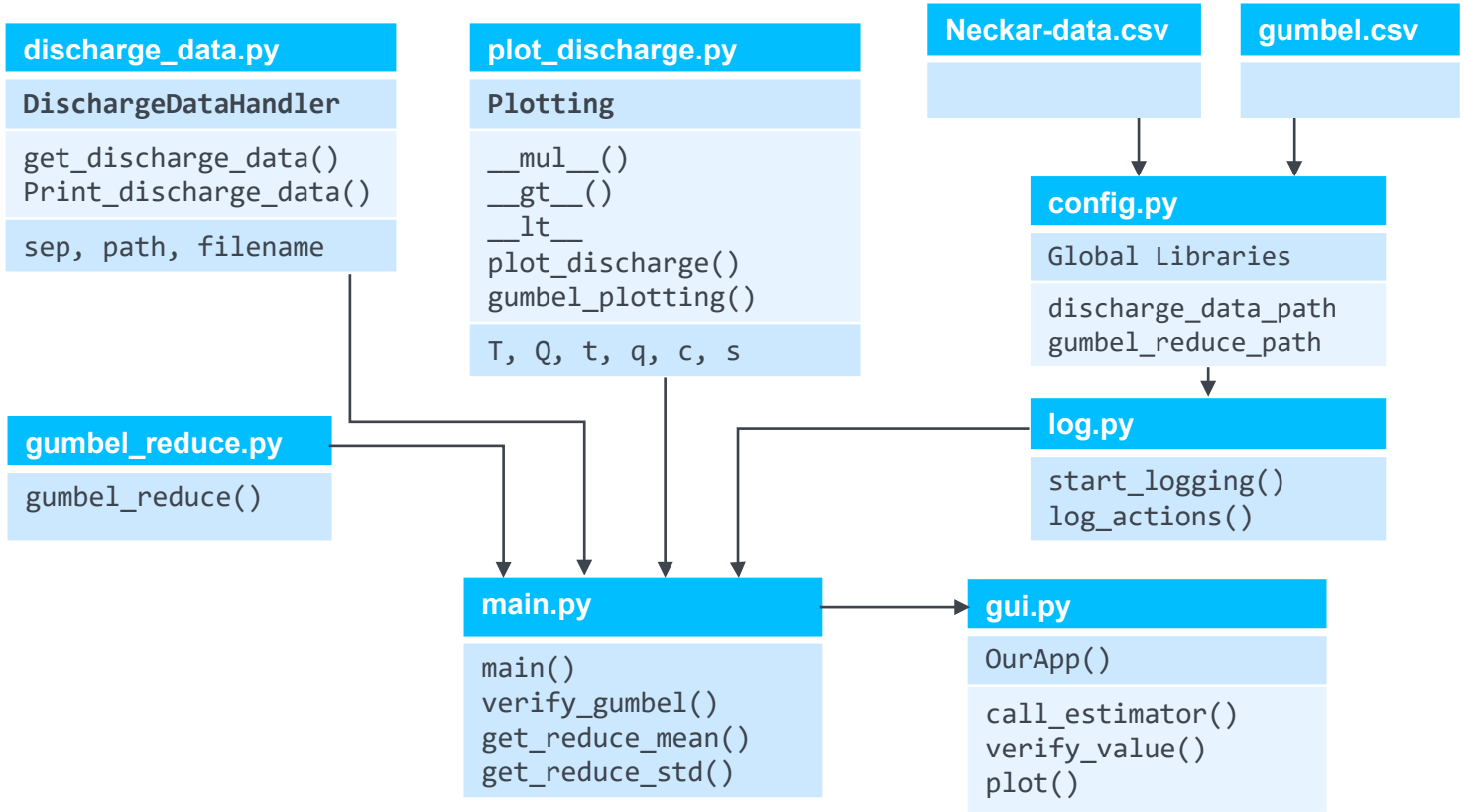
Problem Statements

- Sorting the discharge data
  - Formatting the available discharge data (river Neckar)
  - Fixing date time format and finding the annual maxima
- Gumbel distribution
  - Understanding how to use Gumbel distribution
  - Sorting and extracting Gumbel reduced data and using it efficiently in the distribution
- Classes
  - Writing the custom classes and integrating the auxiliary components
- GUI
  - Displaying the output Plots within the GUI

Functionality

- Extracts discharge data
- Finds annual maxima and plotting the hydrograph
- Loads the Gumbel reduce data
- Calculates the parameters for Gumbel extrapolation
- Determines Gumbel extrapolation discharge values
- Plots the obtained values
- Displays the discharge data and the graphs in a GUI

Qualitative diagram of the code blocks



Constituent elements

- 2 Classes
- Magic methods
- GUI
- Plots
- Logging
- Wrapper function

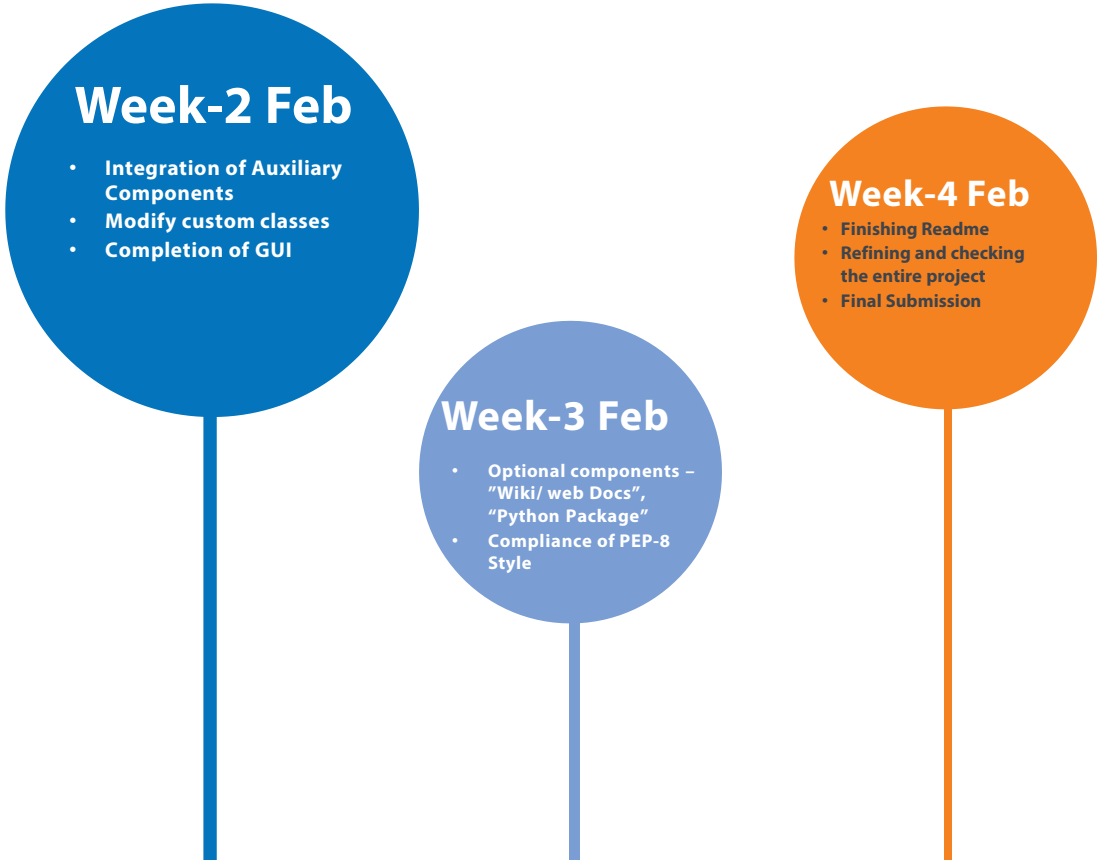
Goals

Implementation of prediction model with GUI

Reusability and integration of classes, functions

Concise and simplicity of the code

Timeline for developing the Program



Resource Allocation

Aswath

- Structure of GUI
- Structure and PEP-8 Styling
- Custom Class
- README
- Functions(Discharge Data handling)

Akash

- Functions (Plotting, Gumbel extraction)
- Gumbel Distribution
- GUI implementation
- Custom class
- README

University of Stuttgart
Germany

Thank you!

Questions?