

## General Map of the Assigned Tasks

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### 1. User Registration and Access with Flask and Dash

**Objective:** Develop a module that manages user registration and login, compatible with Dash.

**Tasks:**

- **Set up Flask:** Configure a basic Flask app to handle routes.
- **User Registration:**
  - Create a registration form for new users.
  - Validate data (e.g., email, password).
- **Authentication:**
  - Implement a login system for registered users.
  - Handle user sessions (e.g., using Flask-Login).
- **Integration with Dash:**
  - Ensure compatibility with Dash to display content after user login.
  - Include options to personalize the app for different users.

**Technologies and tools:**

- **Flask** for the backend (registration, login management).
  - **Dash** for the frontend and visualizations.
  - **Flask-Login** for session management.
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### 2. Report Extraction from Data

**Objective:** Create a module that extracts and generates reports from the data displayed in the app.

**Tasks:**

- **Define the data to be reported:** Identify which data displayed in the app needs to be extracted.
- **Generate Reports:**
  - Create functionality to extract data (e.g., in CSV, Excel, PDF format).
  - Implement automatic report generation based on user interactions.
- **Save and Export:**
  - Create a system for saving the generated reports.
  - Allow users to download or print the reports.

#### Technologies and tools:

- **Pandas** for data management.
  - **pdfkit** or **WeasyPrint** for generating PDFs.
  - **Openpyxl** for generating Excel files (if necessary).
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### 3. Visualizing Ocean Currents from NetCDF Data

**Objective:** Develop a module to visualize ocean current data from a NetCDF file.

#### Tasks:

- **Load the Data:**
  - Use the **netCDF4** module to load ocean current data from a **.nc** file.
- **Preprocess the Data:**
  - Extract necessary information (e.g., latitude, longitude, current speed and direction).
  - Pre-process the data for visualization (e.g., interpolation, normalization).
- **Create Visualization:**
  - Use **matplotlib** or **cartopy** to create a map of the currents.
  - Add arrows to represent the speed and direction of the currents.
- **App Integration:**
  - Integrate the ocean current visualization into the Dash app so that users can interact with the map.

#### Technologies and tools:

- **netCDF4** for reading the NetCDF file.
  - **matplotlib** or **cartopy** for creating the map.
  - **Dash** for frontend integration.
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### 4. Progress Meeting (February 19th, 10:00 AM)

**Objective:** Present your plan and strategy for addressing the assigned tasks.

#### Tasks:

- Prepare a **presentation** on how you plan to tackle each module.
- Discuss technical details with your supervisor (Manuel).
- Receive the reference app code from Manuel to integrate and test your modules.

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## 5. Reference App Code

**Objective:** Test and adapt the existing code to integrate the modules you've developed.

**Tasks:**

- **Receive the app code** developed by Manuel.
- **Test module integration** (user registration, report generation, ocean currents visualization).
- **Adapt the code** to work with the modules you've developed.

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## 6. Participation in the Institute Video Recording (February 24th)

**Objective:** Participate or opt out of appearing in the institute's video recording.

**Tasks:**

- Decide whether to participate in the recording.
- If decided to participate, be available for the video shoot.

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| 1. User Registration and Login (Flask + Dash) |
| - Set up Flask for registration and login |
| - Integrate with Dash for visualizations |
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| 2. Report Extraction from Data |
| - Identify the data to be extracted |
| - Create functionality for generating reports (CSV, PDF) |
| - Implement saving and exporting of reports |
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| 3. Ocean Currents Visualization (NetCDF) |
| - Load data from the NetCDF file |
| - Pre-process and visualize with Matplotlib/Cartopy |
| - Integrate into the Dash app |
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| 4. Progress Meeting (February 19th, 10:00 AM) |
| - Present your plan and approach |
| - Discuss with supervisor (Manuel) |
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| 5. Reference App Code |
| - Receive the app code |
| - Test integration of your modules |
| - Adapt the code to work with your modules |
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| 6. Participation in Institute Video Recording (Feb 24) |
| - Decide whether to participate in the recording |
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