**PROBLEM STATEMENT:**

**TITLE: LEVERAGING IBM CLOUD COMPUTING FOR CLIMATE**

**CHANGE MITIGATION THROUGH BIG DATA ANALYSIS.**

**Background:**

Climate change is a global crisis that demands immediate attention and action. The increasing frequency and severity of extreme weather events, rising global temperatures, and environmental degradation pose a significant threat to ecosystems, economies, and human well-being. Addressing climate change requires comprehensive data-driven insights, and the integration of big data analytics with cloud computing holds great potential to tackle this multifaceted challenge.

**Problem Description:**

The challenge is to harness the power of big data analysis using IBM Cloud Computing to gain deeper insights into climate change phenomena, improve predictive models, and enable data-driven decision-making for mitigation and adaptation strategies.

**Design Thinking:**

**1. Data Selection:** Climate data is vast and diverse, originating from various sources such as satellites, weather stations, sensors, and social media. Integrating this data into a unified, accessible format is a significant challenge.

**2. Database Setup:** Climate data is generated at an unprecedented rate. Managing, processing, and analyzing the enormous volume and velocity of data is essential for timely insights and predictions.

**3. Data exploration:** It is a critical initial step in the data analysis process, where you investigate and familiarize yourself with your dataset. The primary goal of data exploration is to gain insights, understand the data's structure, and identify any potential issues or patterns that can inform further analysis

**4. Analysis Techniques:** Data analysis is the process of inspecting, cleaning, transforming, and interpreting data to discover useful information, draw conclusions, and support decision-making. Here Exploratory Data Analysis is applied,

**Exploratory Data Analysis (EDA):**

* Use data visualization techniques like scatter plots, box plots, and heatmaps to explore relationships and patterns within the data.
* Detect outliers and anomalies in the data.

**5. Visualization:** Designing effective visualizations to present analysis results is crucial for conveying insights clearly and making data-driven decisions. Well-designed visualizations can simplify complex data, highlight patterns, and engage your audience.

**6. Business Insights:** This project's significance lies in its potential to contribute valuable insights and actionable recommendations for climate change mitigation efforts. Leveraging IBM Cloud Computing for big data analysis can empower decision-makers and climate scientists with the tools and knowledge needed to address one of the most pressing challenges of our time – climate change.

**Scope of the Project:**

This project aims to leverage IBM Cloud Computing for advanced big data analysis to address climate change mitigation. The scope includes:

1. Developing a data ingestion and integration pipeline to collect and preprocess climate data from various sources.

2. Implementing high-performance computing and big data analytics on IBM Cloud for climate modelling, simulations, and scenario analysis.

3. Creating real-time monitoring dashboards and predictive analytics to track climate-related events and trends.

4. Enhancing data security and privacy measures to safeguard sensitive climate data.

5. Collaborating with climate scientists and stakeholders to develop actionable insights and recommendations for climate change mitigation and adaptation strategies.

**Expected Outcomes:**

Upon successful implementation, the project aims to achieve the following outcomes:

1. Improved climate modelling accuracy and predictive capabilities.

2. Real-time monitoring and early warning systems for climate-related events.

3. Data-driven insights and recommendations for climate change mitigation.

4. Enhanced scalability and resource allocation for climate analysis.

5. Strengthened data security and compliance measures for climate data.

**Stakeholders:**

- Climate Scientists and Researchers

- Environmental Agencies and Organizations

- Policy Makers and Government Bodies

- IBM Cloud Computing Teams

- Data Scientists and Analysts

- Climate Data Providers

- Environmental Activists and Advocates

**Constraints and Challenges:**

- Limited access to certain climate data sources.

- Data quality and accuracy concerns.

- Budget constraints for cloud resources.

- Complex modelling and algorithm development.

- Collaboration and data-sharing agreements with various stakeholders.