# Java Programming Problems

**General Instructions;**
 i). *Use Java for the different problems*
 ii). *Organize your solutions to the different problems in a folder and create different virtual environments for each problem.*
 iii). *Attempt at least one question in each level (Beginner, Intermediate and Advanced)*

**Mode of Submission:**
 Submission is to be done on GitHub.
1. Create a repository on https://github.com/Department-of-Computer-Science-GU
2. Upload all assignments to the repository created.

**Level1: Beginner**

***Duration:*** *3 Days (Mon, 9th - Wed, 11th )*
**Expectations:**
 ● Develop and make the program work

**Problems**

**1. Build a Fun Fact Generator WebApp**
Build an application that creates interesting facts randomly and displays them on the web interface. It should retrieve these facts from *uselessfacts.jsph.pl* You can use any Java package you are comfortable with.

**2. Weather Desktop Notifications Using Python**
Weather updates are essential in our day-to-day life so in this problem. Build a simple Java script that shows live updates of Weather information on a User's Desktop

**3. Simple Attendance Tracker using Python**
In many learning institutions, we have an attendance system for each subject. It is difficult for students and staff to remember the number of leaves taken for a particular subject. In this problem, build a simple tracker & reminder system for attendance for three subjects where a student can miss a maximum of 3 times. The input to this system is an Excel sheet containing the students' email and their number of leaves in each class subject. This tracker will send out an email to a student when he takes a second leave as a reminder that only 1 more left with him on that subject. If he takes further leave, both the student and the corresponding staff receive emails regarding the lack of attendance. The only thing to do is just enter the subject code and roll number of the student absent from the class and the rest will be taken care of by this tracker system.

**Level2: Intermediate**
*Duration:* *1 Week (Thur, 12th - Thur, 19th )*
**Expectations:**
● Other language integration with Java, API Concepts
● Use Object Oriented Paradigm concepts
● Ensure program correctness

**Problems**
1. **Telegram or X(Twitter) Bot in Java**
    Build a Social Media Bot that retrieves and posts to the social media chosen.

2. **Scraping Reddit using Java**
    Build a web app that scrapes Reddit using Java's Jsoup (Java Reddit API Wrapper)
    module to scrape the data. The scraped data should then be displayed on a website.

3. **Chatbot in Android**
    Build a chatbot where a user can ask a question and the bot responds with an Answer.
    Build a mobile App Interface for the bot using a Technology of your choice.

4. **Spam bot for Telegram**
    Build a spam bot on Telegram, that will send reminders to a user or users after a period
    of time.

**Level3: Advanced**
*Duration:* *2 Weeks (Fri, 20th to Fri, 4th October)*
**Expectations:**
- Program Optimization
- Program Efficiency
- Program Maintainability
- Debug and Error Handling
- Runtime and Space Complexity

1. **Secure, Encrypted Real-Time Messaging System in Java**

Build a secure and encrypted messaging system on platform of your choice (Web, Mobile, Desktop)

Recommendations/Hints:

a. WebSockets
b. Data/Message Encryption/Digest
c. Messaging Protocols

2. **Video Conferencing and Streaming in Java**

Build a video conferencing and streaming application on a platform of your choice. (Web, Mobile, Desktop)

3. **Product Recommendation in Java**

Build a product recommendation system for an e-commerce site selling shoes.

**Hints:**
- Collaborative Filtering
- Content-Based Filtering

NB: Do not use existing models for this application. Custom models are allowed.