Software Architecture Project

The only way to get great architects is to get them to architect

The purpose of this project is to practice architecture and design for a certain system. The system you have to design is a newly build system (greenfield). All necessary aspects have to be built from scratch. There are no existing systems yet.

Use PowerPoint slides with diagrams to create and communicate the design of your system. Try to communicate your architecture with diagrams (not text) so that it is easy for the audience to understand your architecture.

Explain at least the following in your slides:

- Characteristics of the system (lots of data, needs to be reliable, …)
- What are the non-functional qualities of the system, and how are they met?
- What are the core, supporting and generic subdomains and why?
- Styles, patterns, principles and techniques you used, and why you used them
- Draw at least 2 sequence diagrams that show how your system works. These diagrams should show the important architectural aspects of your system, and how it all works together.
- Draw the detailed class diagram of one subsystem/component/service that shows all important classes.
- What are the most risky aspects of your architecture, and how do you want to reduce or mitigate this risk?
- What is the roadmap to build the system (dates, teams, what first and why)?

For every element of your architecture (modules, database, broker,…) on your diagrams, explain what it does and/or contains. If applicable, write next to arrows on the diagram what it means or what it does. Basically, I should be able to understand every slide without having to ask a question what you try to communicate.

Your slides and presentation should mainly focus on architecture, and only briefly on functionality of the domain. The audience (me and your fellow students) know all the architectural styles, patterns, principles and techniques, so don't explain them (again). Just communicate what you use and why you use it.

Next to the Styles, patterns, principles and techniques you can also think about the following architectural aspects:

- Configuration
- Tracing
- Logging
- File management
- Distribution
- Failover
- Load balancing
- Security

- Database
- Transactions
- UI
- State
- Communication protocols
- Containers
- Resilience
- Error management

Presentation
The presentation of the group should take **25 minutes**
After that there is some time left for questions.
The total time should be distributed equally over the members in your team.
Use your time wisely.

Submitting the PowerPoint slides
All presentation slides should be submitted at **19:00 hours on Tuesday**. Points will be subtracted if you submit it later than 19:00 hours.

Grading
Your grade is based on the following aspects

1. PowerPoint slides:
   - How well do your slides communicate your architecture?
   - What is the quality of your architecture, does it fit within the architectural requirements (functional, non-functional, architectural and design principles)?
   - Are the used styles, patterns, principles and techniques clear.

2. Presentation
   - How well and clear is the architecture presented?
   - Do the individual presentations orderly fit together?
   - How well did you manage your time?
   - How well are the questions answered?

Schedule, groups, kata's

Date and time	Group	Kata to present
Wednesday 10:00 – 10:35 AM	1 Ion Timotin Zhuang Niu Meng Guan Segun Oladapo	1
Wednesday 10:40 – 11:15 AM	2 Mohamed Gharib Syed Quamruzzaman Erkhbold Batkhuyag David Borges Linhares	3
Wednesday 11:30 – 12:05	3 Shadi Farrag Bakytzan Rustembekov Yerbol Panaberdiyev Youssef Hammad	4
Wednesday 01:30 – 02:05 PM	4 Tuan Nguyen Truong Son Nguyen Ngoc Tram Ly	7
Wednesday 02:10 – 02:45 PM	6 Nesreen Nusair Arpita Srivastava Netra Raj Bhatt	6
Thursday 10:00 – 10:35 AM	7 Winta Assefaw Livan Goitom Haddish Merhawi Ghebreab Salahadin Mahmud	5
Thursday 10:40 – 11:15 AM	8 Amanuel Goitom Merih Gebreyohannes Samuel Paulos Melat Gebreanenia Hadgu	2

Architectural Katas

1. Hotel management system (like Hilton, Mercure, etc)

We need a nationwide hotel management system that automates all activities in the hotel domain, from reservations to bookings to special actions, payments, hotel services, damages, customer rewarding, etc.

2. Car rental system (like Hertz, Avis, etc)

We need a nationwide car rental system that automates all activities in the car rental domain, from reservations to rentals to special actions, payments, maintenance, accidents, insurance, etc.

3. Package delivery management system (like UPS, Fedex, etc)

We need a nationwide package delivery management system that automates all activities in the package delivery domain, from sending to delivery to track&trace, payments, customer does not accept the package, not deliverable packages, etc.

4. Online food ordering system

We need a nationwide car food ordering system that automates all activities in the food ordering domain, from restaurants to orders to payments, etc. Restaurants can join the system and show their menus and prices. Customers should be able to see the restaurants in their neighborhood, and they can order online from the menu. The payment happens online. The restaurant receives the order, and takes care of the delivery of the order.

5. Airline system (like Delta airlines, American airlines, etc)

We need a nationwide airline system that automates all activities in the airline domain, from flights to bookings to ticket ordering, special meals, luggage, selection of seats, etc.

6. System for Airbnb, an online marketplace for short-term lodging

We need a worldwide marketplace that automates all activities in online lodging marketplace domain, from rental offers to searching to booking, etc. It should offer the functionality like Airbnb.

7. Navy combat management system

We need a combat management system that automates all activities in the combat management domain on a ship, from recognizing threats to risk analysis to controlling weapon systems , etc.

Characteristics:

- We have different radar systems on a navy vessel that provide different radar data (location, infra-red heat patterns, under water sonar,…).

- This data from different radars need to be correlated and the system should be able to recognize and identify the different ships, planes, missiles, etc. around the ship.
- The officer on the ship wants to see a life picture of the situation around the ship.
- The system should also create a list of the current threats with the highest threat at the top
- The system should also propose the best strategy to handle the different threats, and the system should be able to execute the proposed threat handling strategy by controlling the different weapon systems.