

MET CS682 ASSIGNMENT 5

The purpose of this exercise is to give you practice performing system design and using UML.



February 15, 2024

Mahim Choudhury

Boston University

1/26/2024

Table of Contents

[5.1 Class Model 1](#_Toc158627751)

[A5.1 (ChatGPT regarding Class Model) 1](#_Toc158627752)

[5.2 Packages 1](#_Toc158627753)

[5.3 Logical Data Flow Diagram 1](#_Toc158627754)

[A5.3 (ChatGPT re Logical Data Flow Diagram) 2](#_Toc158627755)

[5.4 Physical Data Flow Diagram - Microservices 2](#_Toc158627756)

[Appendix 2](#_Toc158627757)

[References 2](#_Toc158627758)

[Evaluation 3](#_Toc158627759)

[Hints 4](#_Toc158627760)

[Overall Assignment Notes 4](#_Toc158627761)

[Design Goals 4](#_Toc158627762)

[Class Model 4](#_Toc158627763)

[Logical and Physical Data Flow Diagrams 4](#_Toc158627764)

MET CS682 ASSIGNMENT 5

TERM PROJECT PART 3: Design Goals and Data Flow

*Mahim Choudhury*

The purpose of this exercise is to give you practice performing system design and using UML.

1. OBSERVE LIMITS; 2. **USE AI GENERATION** **but only in Explaining your class model in question 5.1. You will need to explain this in your own words as well.** 3. OUTSIDE RESEARCH; 4. NAME YOUR FILE; 5. EVALUATION; 6. HINTS: as before

You will continue developing *EmbeddedAI* by specifying UML design for it, making the same assumptions listed in project parts 1 and 2 (assignments 3 and 4). For clarity, include notes about the scope (what aspects of the whole) your solution addresses and supply the information requested in the Appendix.

The last section contains numerous hints.

# Class Model

Update your class model to reflect the design goals which you will outline in section 5.2. Incorporate the packages, which are described textually in Part 2. Consider including attributes and methods to add clarity to the diagram. Label everything appropriately and clearly. Explain the parts of your class diagram that are not obvious. Identify clearly the added and updated design elements.

Your updated class model and notes replaces this

## A5.1 (ChatGPT regarding Class Model)

Show your most relevant prompt to chatGPT and the response which was most relevant to your solution.

# Packages

In at most one and a half single-space pages (using 12-point type) not including appendices apply design goals to identify appropriate packages, showing which classes belong to which package. Use the headings below to explain how your packages fulfill applicable design goals. Your design goals should focus on Sufficiency, Flexibility, and Reusability, explaining cohesion and coupling in your design and their relationship with design goals. Packaging choices require trade-offs. Explain these as appropriate.

For each package:

* **Package name**: your response replaces this.
* **Design goals for this package**: your response replaces this (single sentence).
* **Design tradeoffs for this package**: your response replaces this.

# Logical Data Flow Diagram

Draw a logical data flow diagram for your design. Explain the parts of the diagram that are not obvious. Your diagram should have roughly 8-10 logical processing elements. Explain the parts of your logical data flow diagram that are not obvious.

Your logical data flow diagram and notes replaces this

# Physical Data Flow Diagram - Microservices

Draw a physical data flow diagram for your design focusing on incorporating Microservices within your design. Explain the parts of the diagram that are not obvious. Your diagram should have roughly 3-5 physical processing elements. You may want to extend the scope of the design to include additional physical processing elements. Consider including elements in your design such as interfaces or Internet of Things as additional physical processing elements. Explain the parts of your physical data flow diagram that are not obvious.

Your physical data flow diagram and replaces this.

# Appendix

Since Term Project Part 3 builds on Term Project Part 1 & 2, provide the mission statement here. For clarification, you may also provide requirements and design you have outlined last week in Term Project Parts 1 and 2—parts you feel are helpful in supporting the updated UML design. This section is not graded.

# References

[1] your first reference replaces this

[2] …

# Evaluation

A picture containing text, screenshot, number, parallel

Description automatically generated

**Please do not include Hints section in your solution.**

# Hints

## Overall Assignment Notes

* You may use Draw.io, Visio, LucidChart, or another design tool of your choice (please check with your facilitator in advance if not using Draw.io, Visio or LucidChart).
* The module notes are a primary source for explanations and examples; we also encourage you to do outside reading and research to gain additional perspective.
* **Thoroughness and Coverage:** Accompany each requested section with a brief description that explains your thinking and the choices that you made.
* **Consistency and Clarity:** Make sure that you have a consistent design throughout the solution. You will want to iteratively review all four sections to make sure that together they are consistent as a single solution.
* **Clarity:** Are diagrams clear to read? (e.g., avoid overlapping lines, non-polished designs).
* **Relevance**:
  + Is the scope of your design relevant to the solution? For example, choosing the data flow scope, classes, and methods that are secondary (for example, authentication might be important – but with limited scope of your assignment it may not be the focus).
  + This is the usual editing process. It is tempting to repeat important points but this often weakens your work and can appear to the reader like padding.

## Design Goals

* Your focus should be the beginning sections of the Module 5 Notes “The Goals of System Architectures and Designs”
* **Technical Soundness:**
  + Solution shows understanding in context of goals of system design (i.e., a thorough discussion of how sufficiency is satisfied in the design, with links to the solution’s class model and links back to the requirements).
  + Do you show distinction and understanding between cohesion and coupling of classes and packages within your design to support the selected design goals?
* **Thoroughness and Coverage:**
  + Make sure to explain how the selection of your packages specifically supports the goals of system design for this scenario, avoid being generic.
  + Are tradeoffs between goals of design covered?
  + Is cohesion/coupling covered within the context of goals of system design?
* **Clarity:** Are tradeoffs between cohesion and coupling clearly explained? For example, mentioning high cohesion is not enough - a clear link between the design needs to be made, and explained (e.g., classes and relationships in the class model show cohesion in package).

## Class Model

* **Clarity**: Did you add a new class or relationship – is it aggregation or composition? Look to explain your updated design and show changes in a different color.
* Other hints and notes on approaching class modeling are covered in Assignment 4.

## Logical and Physical Data Flow Diagrams

* Physical data flow diagrams are described in the Module 5 Notes within the “Data Flow Diagrams” section.
* **Technical Soundness:** 
  + Make sure to understand the difference between logical and physical data flow diagrams
  + Is the focus on the physical processing elements and not on the logical processing elements in the physical data flow?
  + Are all the data flows correct (e.g., external actor not sending data flow directly to data store, but through a processing element, data flows appropriately labeled with data and not a process (action).
  + No “dead-ends” in processing elements. Each processing element should have an input and an output.
* **Clarity:** Explain the scope of your data flow diagrams.