



Essay Assignment:
Master's in Management and Digital Technologies application for winter semester
2024/25

Dear applicants for the *Master in Management and Digital Technologies*,

as part of your application, we ask you to solve two exercises that test prerequisite knowledge and capabilities that are pivotal to succeed in the MMT program. This assignment includes a business-related exercise concerning digital business models and an informatics-related exercise concerning programming. Both exercises must be answered.

With these essays, we can ensure that applicants with a business-related background have the necessary informatics skills required for the digital technologies part of the MMT and vice versa for the management part of the program. Therefore, if you fail to answer one of the exercises, your application cannot be considered.

Please make sure to comply with the following instructions:

- Please provide your answers in **English** and in **full sentences**.
- No **plagiarism** will be tolerated. Please **refrain from the use of direct quotes**.
- Provide all sources used for both assignments.
- The answer to Exercise 1 should not exceed **2000 words**.
- The answer to Exercise 2 should be **as lean as possible**.
- Please submit the answer to Exercise 1 as a singular file in **.doc, .docx or .pdf format**.
- Please provide the answer to Exercise 2 in the form of an **executable code** (Java, JavaScript, Python, C++, C#, Dart, Groovy). The **required files are to be integrated into a .zip directory**.

Good luck.

Yours sincerely

The MMT Coordination Team



Exercise 1: Digital Business Models

You are planning on founding the software platform company “ChatBot”. It offers the app DirectChat, which is an instant messenger that can be downloaded to Android- and iOS-based smartphones. Its key purpose is to allow for text-message exchange between its users. The ChatBot platform also allows for the download and use of third-party apps within the messenger DirectChat, which are free of charge for the users of DirectChat. These third-party apps are voluntarily developed by external software developers and generate revenue by the display of advertisements within them. The ChatBot platform aggregates this ad space and offers it to interested advertisers. Hereby, ChatBot acts as an intermediary and keeps 50% of the revenues from the advertisements. The remaining 50% of advertising revenues are given to the developers of the app in which the respective advertisement is displayed to the user.

- a) Please briefly explain the **concept of multi-sided platform markets** and correspondingly **direct and indirect network effects**.

Subsequently **describe how ChatBot’s business model fits into the understanding of multi-sided markets and illustrate network effects**. Please refer to the following actors: ChatBot, third-party app developers, advertisers and consumers. You may use an illustration if you like.

- b) How do DirectChat’s **users benefit** from the multi-sided platform model? Please refer to direct and indirect network effects.
- c) ChatBot wants to expand its operations and looks for innovative ideas for new revenue streams. Based on its current platform business model, please briefly outline **two possibilities for new revenue streams**.

- Please use scientific sources to your explanations. It is mandatory to cite all used sources in Harvard Style.
- It is mandatory to create at least one visualization.



Exercise 2: Programming

The retail company “Grocery4ALL” demands a new booking system that keeps track of their inventory, revenue, and costs regarding their business operations.

Now it’s your task to provide a system that is capable of handling the following tasks:

- Create an inventory of products entailing ID, name, quantity, purchasing price, and selling price (**10 different products** should be a good starting point).
- Show Inventory: Display the inventory containing all products.
- New products: Add new products to the inventory.
- Selling products: Sell products from the current inventory.
- Restock products: Increase the stock of current products.
- Show the last transactions.
- Calculate the total revenue, total value of the inventory, total costs, and total profit.

Interaction:

- Your program should ask the user what to do next. So whether a new product should be added, a given product should be restocked, or sold, or calculations should be provided.
- Regarding calculations you should be able to choose between the total revenue, the total value of the inventory, the total profit, or the total costs.
- Also the inventory value should be able to be displayed for specific product IDs.
- Adding products, restocking products, and selling products are considered transactions.
- Costs do occur whenever a transaction (add product, reorder product) is processed.
- Revenue is generated whenever a product is sold.
- Revenue & costs start with a value of 0 and are updated with every transaction.
- **The program shuts down gracefully without any error messages. Error handling is expected.**
- For this task you can use the following languages: Java, JavaScript, Python, C++, C#, Dart, Groovy. Please attach all relevant code and files as a zip directory to your MMT application.

Please **annotate each line of code with a comment explaining its purpose. Each method should have documentation on what it does, how it works, and what parameters are expected.** The program should be standalone and executable from a standard computer with a minimal amount of dependencies (**Preferably it can be run from one single data file or .exe file**). The interaction can be via a graphical user interface or a terminal. The **selection of the interaction method does not influence** our evaluation of your code.