



## ESSAY ASSIGNMENT: MMT APPLICATION FOR WINTER SEMESTER 2021/22

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. Irrespective of your background, both exercises need to be answered. This way, 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**.
- The answer to Exercise 1 should not exceed **2000 words**.
- The answer to Exercise 2 should be **as condensed 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, whereby 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 “Chat Inc.”. It offers the app NowChat, 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 Chat Inc. platform also allows for the download and use of third-party apps within the messenger NowChat, which are free of charge for the users of NowChat. These third-party apps are voluntarily developed by external software developers and generate revenue by the display of advertisements within them. The Chat Inc. platform aggregates this ad space and offers it to interested advertisers. Hereby, Chat Inc. 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 Chat Inc.’s business model fits into the understanding of multi-sided markets and illustrate network effects**. Please refer to the following actors: Chat Inc., third-party app developers, advertisers and consumers. You may use an illustration if you like.

- b) How do NowChat’s **users benefit** from the multi-sided platform model? Please refer to direct and indirect network effects.
- c) Chat Inc. 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**.



## EXERCISE 2: PROGRAMMING

The simplest way to keep track of your personal budget is to record all income and expenses. Please write a book-keeping program that helps you with this task. It should be able to record transactions and give you an overview of your budget. Further, the program should be able to:

- Read a file of previous transactions from disk
- Write additional transactions to the file
- The file is structured to include a description, the amount and the date of the transaction
- You can choose txt, csv, json or xlsx as format for the transaction file
- Interaction:
  - Your program should ask the user what it should do next (record a transaction, calculate the current budget or exit the program)
  - Transaction
    - Your program should ask the user to insert the description, the date and the amount of a transaction (positive for income, negative for expenses)
    - Your program reacts with a confirmation that the transaction has been saved to file and returns the current budget
    - *Bonus: The user is able to insert multiple transactions at once*
  - Current budget
    - Your program returns the current budget and the last 10 transactions
    - *Bonus: The user can specify how many transactions the program should return*
    - *Bonus: The user can specify a date range for the transactions to be returned (e.g. all transactions in January 2021)*
  - Exit the program
    - The program shuts down gracefully without any error messages

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 as to what it does, how it works and what parameters are expected. The **program should be standalone and executable from a standard computer with minimal amount of dependencies**. The transaction file should be saved in the same directory. The interaction can be via a graphical user interface or a terminal. The selection of the interaction method has no influence on our evaluation of your code.