1. **Compare Document-oriented and Column family non-relational database models.** (10 Marks)
   - Discuss what needs to be considered when choosing which model to use when a scalable database needs to be used to store and query very large amounts of data.
   - Describe two scenarios:
     - A: When it is more beneficial to use Document-oriented model over Column family model.
     - B: When it is more beneficial to use Column family model over Document-oriented model.
   - Discuss and provide supporting argumentation for both scenarios, why do you think the selected model is more suitable?

2. **Design the structure of a MapReduce application, given the following input dataset description and desired result.** (10 Marks)
   - **Input Dataset:** Text files, where each line contains a CSV record with the following structure and example content:
     - ID, company, city, year, month, income, expenses
     - 365784, Best laundry, Tallinn, 2018, 6, 36237, 23621
   - **Desired result:** For every company, find which month of the year is the most profitable on average for each of the companies?
   - Define what should be the input and output Key-Value pairs for Map, Reduce and Combine functions and provide a step-by-step description of how they transform the given input into required output.
   - Define what should be the structure of Map, Reduce and Combine functions:
     - **Map function**
       - Input:
       - Function description:
       - Output:
     - **Reduce function**
       - Input:
       - Function description:
       - Output:
     - **Combine function**
       - Input:
       - Function description:
       - Output:

3. **Describe a detailed scenario when a system deployed in Cloud needs to be scaled, but horizontal scaling is not sufficient by itself and vertical scaling needs to be applied instead.** (10 Marks)
   - Discuss and provide supporting argumentation why horizontal scaling is not sufficient for the described scenario and why vertical scaling suits better.