**Italic text is just my suggestions or opinions, please do not put them in your report!**

**P4+M4**

a. Choose one problem (well-defined problem) to solve. Describe it.

Hint:

Stack

- Reversing an Array Using a Stack

- Matching Parentheses

- Converting Decimal Numbers to Binary Numbers

Queue

- Printing Task

- Palindrome-Checker

b. Problem solving by a complex AD

(there are two implementations (code):

- Implementing of complex ADT (+main function)

- Using this ADT to solve above problem (+main function))

p/s: a brief explanation of the functions in each class

c. Demonstrate (image + detailed explanation) why and how you can solve this problem. **(M4)**

**P5**

a. What is error handling? Definition of Try-catch block?

b. The benefits of error handling?

c. Report test results: Implement a test case to interpret error handling

(*just show the code which occurred the exception*)

**P6**

a. - What is asymptotic analysis?

- What is best, average and worst case in an algorithm?

- How to analyze algorithm?

- What is Growth rate?

Show some common growth rates to compare.

b. The importance of asymptotic analysis?

c. Applying asymptotic analysis in an algorithm.

*(I have some option for you, choose one:*

- *A searching algorithm.*

- *Using your code in P4b.)*

**P7**

a. Determine two ways in which the efficiency of an algorithm can be measured

- What is time complexity? How can measure time complexity?

- What is space complexity? How can measure space complexity?

b. Illustrating your answer with an example.

*You can show an example to explain about time and space complexity. However, in the beginning, you have to mention about space complexity of datatype variables in java.*

M5

a. Time-space complexity Trade-off

c. What is time-space complexity trade-off?

d. Types of Time-space Trade-off

b. Example about time-space complexity trade-off.

D3

- Analyse the complexity of common ADT:

*You have a well-defined problem which is solved by using ADT.*

*Evaluate the complexity of this algorithm (time + space)*

D4

List three benefits of using implementation independent data structures and explain in detail.