

NTNU
Norwegian University of Science and
Technology

Faculty of Information Technology,
Mathematics and Electrical Engineering

ENGLISH

Department of Computer and Information
Science



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Exam in
TDT4140 Systemutvikling

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kl 0900 - 1300

Aids A1:

Calculator
All printed and handwritten material

Contact during exam:

Professor Torbjørn Skramstad, tlf. 91843, 97123246
Post. doc. Thomas Østerlie, tlf. 90785, 98222181

The points shown for each exercise gives information about maximum number of points for each exercise. Within each exercise the subtasks count the same.

Good luck!

Introduction

Wherever the term "system" is used we are referring to the system described in Annex A.

If you need information not given in this text you have to:

- Explain briefly why you need this information.
- Make the necessary assumptions. These assumptions must be described in your solution.

Exercise 1 – Use-case, 25 points

1. Make use-case diagrams for all functions in the system.
2. Make textual use-cases for the following scenarios:
 - Registration of new appointment with auto repair shop.
 - Make a plan for which cars are coming to the auto repair shop the following day.
 - Produce an invoice to the customer.

Exercise 2 – Planning, 30 points

Four persons are booked for developing the system – you and three additional persons.

1. Make a WBS – Work Breakdown Structure – and a cost estimate for the system based on the WBS. Substantiate the assumptions you base your solution on.
2. Make a Gantt diagram for the development of this system, assuming you are four persons working full time on the project.
3. After you have finalized the plan you are told that a system with reduced functionality has to be finish within the next week since a potential buyer of the system would like to see it. Make a new plan showing how you will plan this change. One of the project members is sick and you have to make a plan with only three persons. You have to decide which parts of the system you assume is most important to have ready for the demonstration.
4. Make a risk analysis of the development project for this system. Identify the most important risks and describe preventive and corrective actions.

Exercise 3 – Class diagram, 30 points

1. Draw class diagrams for all the classes in the system at a level of detail suited for early development phases – high level design.
2. Make sequence diagrams for the scenarios described in exercise 1, sub-question 2.
3. How would you need to change the classes if the system should be extended to allow for individual vacation planning for the car mechanics?

Exercise 4 – Testing, 15 points

We and our customer – Company X – wants to have a system that is easy to use. The customer did not have sufficient knowledge to specify the usability aspects of the system, but we have anyhow decided to test this thoroughly so the system will be easy to use. This will give us and the system good reputations and increase the possibility to get later projects for Company X. In addition we also want to test the functionality of the most important functions of the system.

1. Make a plan for testing of usability. The plan should include possible improvements of usability if the tests should indicate that the usability is not sufficiently good.
2. Make a test plan that shows how you will test the functions described in exercise 1, sub question 2.

Annex A – IT system for an auto repair shop

The system is to be used for planning and managing the repair and service of cars at an auto repair shop. The system should be used by all car mechanics, the parts and accessories department as well as the management and the reception and the operator of the telephone switchboard. The auto repair shop is a brand garage (normally repairs cars of a particular brand), but it can also be used for other car brands.

The customers will normally contact the repair shop by telephone, but might also approach by e-mail or by just arriving at the repair shop.

The system has the following functionality:

1. Make an appointment for service or repair. Necessary information:
 - Registration number and year of manufacture. If the car brand is different from the normal brand, also the brand is stored.
 - What type of work is to be performed. A set of predefined work orders may be recorded, example Periodical service (e.g. 30.000 km), change of brake blocks of the front wheels, aligning of car body after a collision, painting etc. It should also be possible to record a free text description of the work to be performed.
 - The name, address and telephone number to the owner of the car.
 - Based on availability to the car mechanics and space in the repair shop the system will find one or a few alternatives for the appointment.
2. Cancel an appointment. The customer addresses the repair shop to cancel an appointment. The customer will often at the same time ask for a new appointment.
3. Handing in the car. The customer arrives at the repair shop with the car. The repair shop checks whether the car is delivered according to the appointment based on registration number or name of customer. The mileage of the car is registered.
4. The car is examined by a mechanic to check if additional work has to be performed (additional to originally planned). If spare parts are needed the parts and accessories shop has to be checked for availability of relevant parts. If necessary new parts may have to be ordered, and the customer informed that the repair may take more time. The mechanics also checks which work has previously been performed on the car. The system needs to have functionality for recording and fetching of history information about car repairs.
5. During service/repair all work performed is recorded, which spare parts are used, how much time is used by the mechanics for each work unit, and the name of the mechanics that performed the work.
6. At the end of a day the system should prepare a plan showing which cars will come to the repair shop the following day and send a reminder to the car owner by SMS.
7. When the work is finished the system should prepare an invoice based on the work performed, time used and spare parts used.
8. The car is picked up by the customer; this is recorded in the system.
9. Complaints and claims: If the customer is dissatisfied with the work or the price, he might make a complaint or a more formal claim. Such complaints should be registered in the system with time of complaint and reason for complaint.