# Information rörande tentamen
**-inlämnas tillsammans med tentamen**!

Kurskod:…**PA1106**……. Datum:……**2013.06.05**……...

Kursnamn…): SOFTWARE DESIGN (PROGRAMVARUDESIGN).....

**Ort;**……**Karlskrona**……
Ange på vilken ort tentamen ska genomföras. E**tt kuvert per ort!**

Tid:…… …… Sal: …….

Ansvarig lärare:……**Ludwik Kuźniarz**.....

Kommer till salen klockan:……

Nås per telefon: +46 455 38 5853 or +46 734 223 621
klockan: 15 - 18

Ange vilka hjälpmedel som är tillåtna

……English – Swedish Dictionary……..

……..

……..
Markera med kryss om studenterna, efter tentamen, får ta med sig tentamnesfrågorna

☐ Ja ☑ Nej

Markera med kryss var du efter tentamen hämtar samtliga tentor.

☑ **Receptionen i Karlskrona**

☐ Receptionen i Ronneby

☐ I salen direkt efter tentan

Observera att om tentamen ska avhämtas på annan ort än där den genomförs så kan det ta upp till tre dagar innan den är tillgänglig.

Övrigt
The examiner Ludwik Kuzniarz will be accesible by phone during the exam time.
……..

Tentamenssamordnare
Cecilia von Mentzingen
Tel: 0455-385035 or 0734– 292 113
e-post: Cecilia.von.Mentzingen@bth.se

BLEKINGE INSTITUTE OF TECHNOLOGY

Written test in (subject): **Software Design PA1106**

Date:___ **June the 5th , 2013**

Name: _____

Civic number: _____

Number of sheets handed in:_____

Mark the question(s) you have answered by putting a ring around the relevant number(s)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

**Instructions**

A student who cannot produce valid ID will not be permitted to take the examination.
No examination scripts will be accepted by the proctor during the first hour of the examination.
(Students arriving late will thus be permitted to take part in the examination).
Write your name and civic number on each sheet of paper you hand in.
Examination results are posted by e-mail no later than 10 working days after the date of the examination. Exceptions to this rule can occur. In this case, students will be informed by the teacher responsible for the course/program or by the examiner.
All blank answer sheets are to be handed in to the proctor.

**(To be filled in by the proctor)**

ID presented: _____

Proctor's sign.

Student union fee paid: _____

Proctor's sign.

Student union fee not paid: _____

Proctor's sign.

**(To be filled in by the teacher )**

Number of credits gained:_____ Grade:_____ ECTS:_____Examiner´s sign:_____

**(To be filled in and signed by the student, after the correction of the examination)**

*I hereby sign my examination script. I am aware that by signing for my script, after correction, I waive my right to contest the examiner's comments and the credits or grade awarded.*

Date_____ Signature:_____

Ludwik Kuzniarz
Blekinge Institute of Technology
School of Computing
Karlskrona

June the 5th, 2013

# Course PA1106
# Software Design
# First Exam

**Points**

| Question 1 | Question 2.1 | Question 2.2 | Total |
|---|---|---|---|
| | | | |

**Grade**

| BTH | ECTS |
|---|---|
| | |

---------- Explanations ----------

## Questions.

For the multiple choice questions your task is to indicate the following statements as *true* T or *false* F by placing the appropriate letter indicator in the [ ].

For instance

[ T ] John likes Mary

indicates that the statement is true, or more precisely you think it is true.

John is
[ F ] Swedish
[ T ] English
[ F ] 5 years old

indicates the John is not Swedish, he is English and he is not 5 years old,

If you know that John is German and 20 years old, you should made the following indications:

John is
[ F ] Swedish
[ F ] English
[ F ] 5 years old

For the problem questions your answers should be written in the predefined marked places

either labelled boxes 

or along labelled lines ..... .....

Well structured answers will be appreciated.

**All questions should be answered in the context of the course, i.e. the terms and phrases used in the text have the meaning defined and used in the course.**

## Marking

Every question, just after the question number, has a number of points allocated for that question.

If all entries for the question are marked correctly you obtain that number of points. For any wrong answer for the question one point is subtracted from the number of allocated points but no negative points are generated. It means that if a question has 2 points allocated and has three places to mark T or F then when you make one error you get 1 point for that question, when you make two errors you get 0 points and when all the answers are wrong you also get 0 points.

The exam is worth 60 points, from 31 points is E (passed), from 51 – A.

## Allowed books

English – Swedish dictionary

## A remark on drawings

In the case of tasks that require producing drawings – conceptual models, state diagram, class diagram – please draw first your draft solutions on a spare paper and then redraw them on the marked area on the examination paper trying to arrange the elements (and especially connecting lines) of the picture so that the models were easy readable.

*So, good luck !*

## 1. Knowledge 25 p

1. 2 p

Unified Development Process can be characterized that:

[ ] is iterative

[ ] is incremental

[ ] is based on the Water-Fall model

2. 2 p

The tasks performed during the Requirements Analysis include

[ ] identification of processes

[ ] drawing UseCase Diagrams

[ ] writing operation contracts

3. 2 p

Conceptual Model shows

[ ] shows attributes

[ ] shows operations

[ ] relationships between concepts

[ ] objects and their relationships

4. 2 p

Interaction Diagrams include:

[ ] collaboration diagrams

[ ] sequence diagrams

[ ] state diagrams

5. 2 p

Purpose of producing System Sequence Diagrams is

[ ] to illustrate realisation of the system operations,

[ ] show collaboration between actors interacting with the system

[ ] to identify system operations

6. 2 p

Collaboration Diagram:

[ ] is usually prepared for a system operation to illustrate massages sent between instances,

[ ] can be replaced by a sequence diagram,

[ ] starts with a message representing a system operation

7. 2 p

Observer Pattern suggests a solution for

[ ] keeping cohesion low

[ ] keeping cohesion high

[ ] separating user interface and internal information representation

[ ] managing several views of the same object

8. 2 p

Controller is responsible for

[ ] allocating resources to collaborating objects

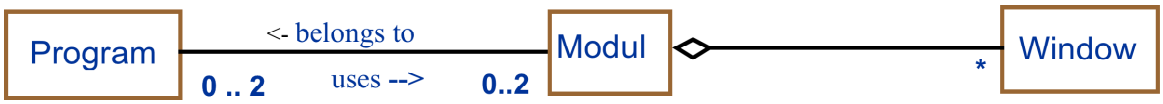
[ ] dispatching (properly redirecting) messages coming to the system

[ ] ensuring proper interaction with the system by actors using the system

[ ] controlling the values computing during the execution of system operations

9. 9 p

Consider a domain described by the model




Is the situation described bellow consistent with (allowed by) the above model:

[ ] Orphan:Module does not belong to any Program,

[ ] There is only one Single:Module belonging to Test :Program,

[ ] M :Module belongs to Test1:Program and Test2:Program,

[ ] Game :Program uses two modules GUI:Module and Controller :Module,

[ ] There must be at least one Module belonging to every Program,

[ ] A :Module belonging to Strange:Program has no Windows attached to it,

[ ] The same Module cannot belong to two different Programs,

[ ] Lonely:Window does not belong to any Module

[ ] A Common: Window can be removed from M1:Module and attached to M2:Module,

[ ] The number of existing Modules and the number of existing Programs must be the same,

[ ] Every Window must belong to a Module.

[ ] The number of Windows cannot be smaller than the number of Modules

# 2. Skills 35 p

## 2.1. Object-Oriented Modelling 12 p

### 2.1.1. Domain Description.

At the ODD university there are two sorts of persons – students and teachers.

Students study at the university and teachers are employed.

Teachers deliver courses and students study courses.

Courses are of two kinds – lectures or lab projects.

Courses take place in rooms - lectures in lecture rooms, labs in lab rooms.

Every room has a name and capacity – the number of persons that can sit in the room.

Labs are equipped wit computers and lecture rooms with a projector.

In every room there is also a board.

There can be from 10 to 30 computers in every lab. Every computer has a unique identifier.

Every student has a number of credit point which she/he has colleted from the successfully completed courses.

Every course has
- a course code – 6 characters,
- course syllabus – a text describing the course,
- the number of credits which are assign to students after completing the course and
- upper limit for participants the can take the course at the moment.

Every students has a study record where the total number of study points – the sum of points of all completed courses - is stored.

Any person – student and teacher – can work on every computer as a guest user.

Teachers can work on computers as special users and to do so they have different special rights, defined in start sessions, on different computers.

Every person has a magnetic id card containing personal social security number and card pin code.

### 2.1.2. Your task

Draw conceptual model for the following fragment of the problem domain
concerning the ODD University

*In your model use advanced modelling features.*

Domain Model

## 2.2. Object-Oriented Design 24 p

### ODD University Support system

For the domain described in the previous question, a computerized management system should be designed.

The system should help with the administration of the courses delivered by teachers and attended by the students.

Student can enrol (register) to courses through the system. Student will be register for the course only if there are still free places on the course. Student can also cancel his previous registration.

Teacher can introduce courses to the system, make changes in the course she/he delivers or cancel such a course. After exam teacher responsible for it input the results to the system and students get the points allocated for the course if they passed the exam.

Only a permitted person can use the system. To use the system it is necessary first to login. This is done by using a plastic id card, which every person has.

At every moment the user of the system can request a list of courses registered in the system.

#### 2.2.1. Your tasks

A. Identify **Actors** 1 p

B. Identify **Use Cases** 1 p

C. Draw **Use Case Diagram** 1 p

D. **Evaluate Use Cases** and provide Development Plan 1 p

E. Write **Extended** version of *MostImportant* **Use Case** 3 p

F. Draw **Conceptual Model** (= relevant part of Class Diagram from question 2.1) 2 p

G. Identify **System Operations** based on *MostImportant* Use Case 2 p

H. Write a **Signature** and **Contract** (text) for a *Chosen* System Operation from p.G 2 p

I. Describe the contract for the *Chosen* operation (from p.H) using **Stage Metaphor** 4 p

J. Draw **Design Class Diagram** including elements relevant for the *MostImportant* Use Case 3 p

K. Draw **Collaboration/Sequence Diagram** for the *Chosen* operation 2 p

L. Draw the part of class diagram influenced by p.K ( = show identified methods ) 2 p

A. Actors

| Name | Description |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

B. Use cases

| Name | Description |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

C. Use Case Diagram

D. Evaluation of Use Cases

| | |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

Development process

E. Extended version of *MostImportant* Use Case

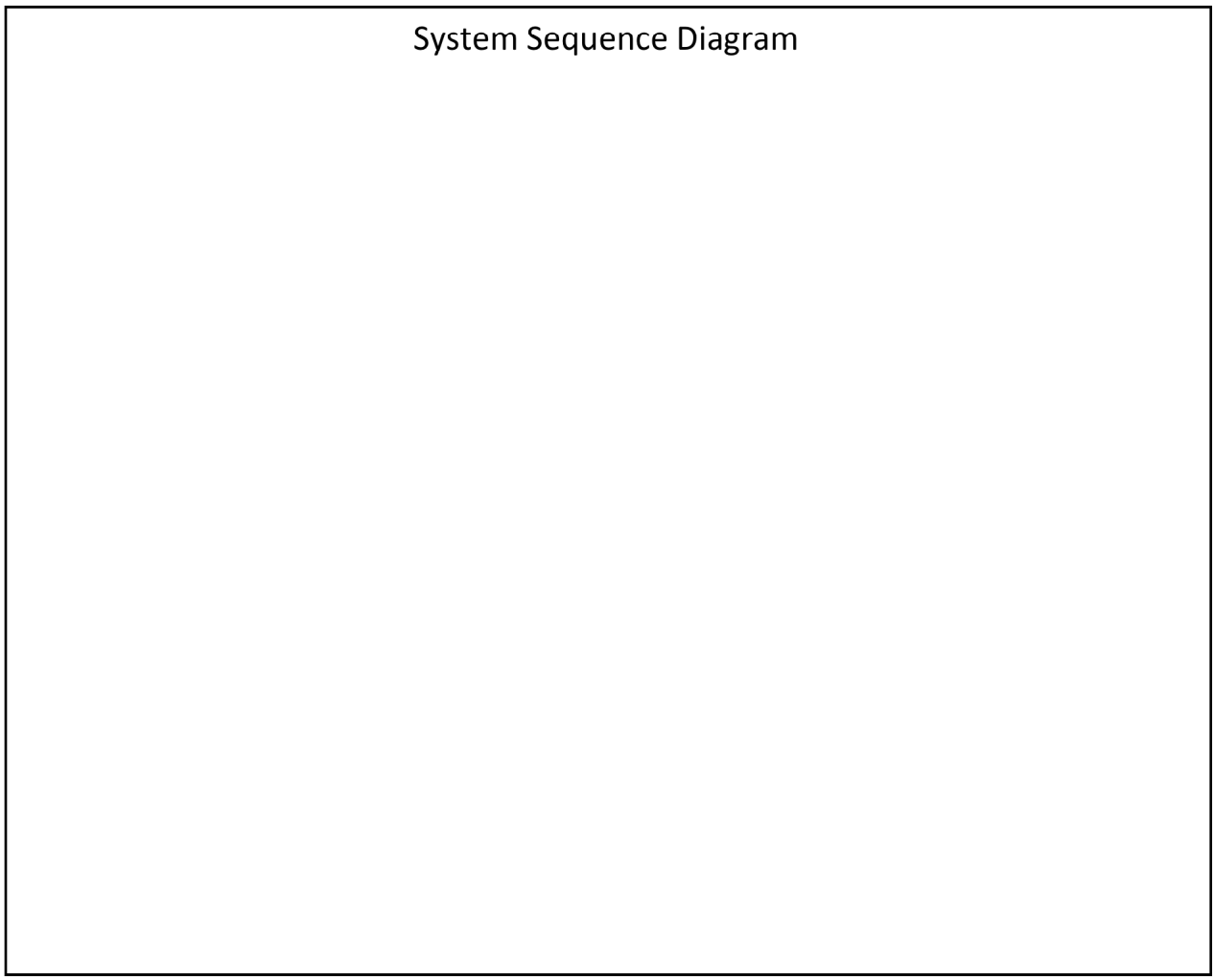
N.B. Use the Use Case Format introduced on the lectures

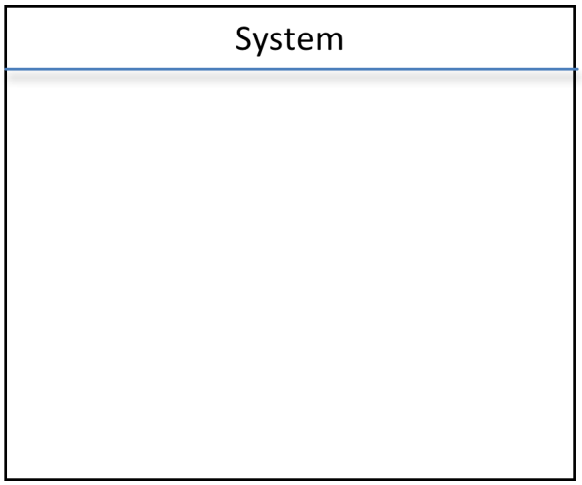
F. Conceptual Model = Domain Model from the previous question 2 p

Conceptual Model

G. System operations 2 p

System Sequence Diagram




H. Signature for the *Chosen* system operation 2 p

Hint.

*Signature for an operation specifies the name of the operation, arguments and returned value*

.....

.....

Contract for the *Chosen* operation - text

I. Contract for the *Chosen* operation 4 p

Stage Metaphor

.

J. Collaboration Diagram for the *Chosen*……5 p

Collaboration Diagram for ……..( ……..…… )

K. Part of the Design Class Diagram included elements used in point .J 4 p

Design Class Diagram