

### SEMESTER TEST / SEMESTERTOETS 3

MODULE CODE/KODE:	ITRW 213	DURATION/DUUR:	60 min
EXAMINER/EKSAMINATOR:	Imelda Smit	MARKS/PUNTE:	30
MODERATOR :	Dr Roelien Goede	DATE/DATUM:	16-05-2012
		TIME/TYD:	9h30

#### MEMORANDUM

Answer all the questions./ Beantwoord al die vrae.

#### Question 1 / Vraag 1

[13]

Study the following table / Bestudeer die volgende tabel:

(Proj#, Proj\_Name, Emp#, Emp\_name, Job\_Class, Hourly\_Charge, Hours\_Worked)

- 1.1 First state the 1NF, 2NF and 3NF definitions / Stel eerstens die 1NF, 2NF en 3NF definisies. (3)
- 1.2 Indicate the primary, concatenated and foreign keys / Dui die primêre, saamgestelde en vreemde sleutels aan. (3)
- 1.3 Indicate all dependencies / Dui alle afhanklikhede aan. (4)
- 1.4 Based on the information you have supplied, state the 1NF, 2NF and 3NF tables for the given example. Gebaseer op die inligting wat jy voorsien het, gee die 1NF, 2NF en 3NF tabelle vir die gegewe voorbeeld. (3)

**Answer:** Refer p 299-306 & class example

- 1.1 1NF – an entity whose attributes have no more than one value for a single instance of that entity (repeating groups) ✓  
2NF – an entity whose non-primary key attributes are dependent on the full primary key (partial dependencies) ✓  
3NF – an entity whose non-primary key attributes are not dependent on any other non-primary key attribute (transitive dependency) ✓
- 1.2 Primary: Proj# ½✓, Emp# ½✓; Concatenated Proj# + Emp# ½✓ foreign Proj# ½✓, Emp# ½✓, Job\_Class ½✓
- 1.3 Proj# --> Proj\_Name ✓  
Emp# --> Emp\_name, Job\_Class, Hourly\_Charge ✓  
Proj# + Emp# --> Hours\_Worked ✓  
Job\_Class --> Hourly\_Charge ✓
- 1.4 1NF is represented as shown (Proj#, Proj\_Name, Emp#, Emp\_name, Job\_Class, Hourly\_Charge, Hours\_Worked), but with data filling each cell. ½✓  
2NF tables include (Proj#, Proj\_Name) ½✓; (Emp#, Emp\_name, Job\_Class, Hourly\_Charge) ½✓; (Proj#, Emp#, Hours\_Worked) to remove partial dependencies. ½✓  
3NF take (Emp#, Emp\_name, Job\_Class, Hourly\_Charge) and break it into (Emp#, Emp\_name, Job\_Class) ½✓ and (Job\_Class, Hourly\_Charge) ½✓ to remove the transitive dependency.

**Mark allocation:**

✓ or ½✓ as indicated

#### Vraag 2 / Question 2

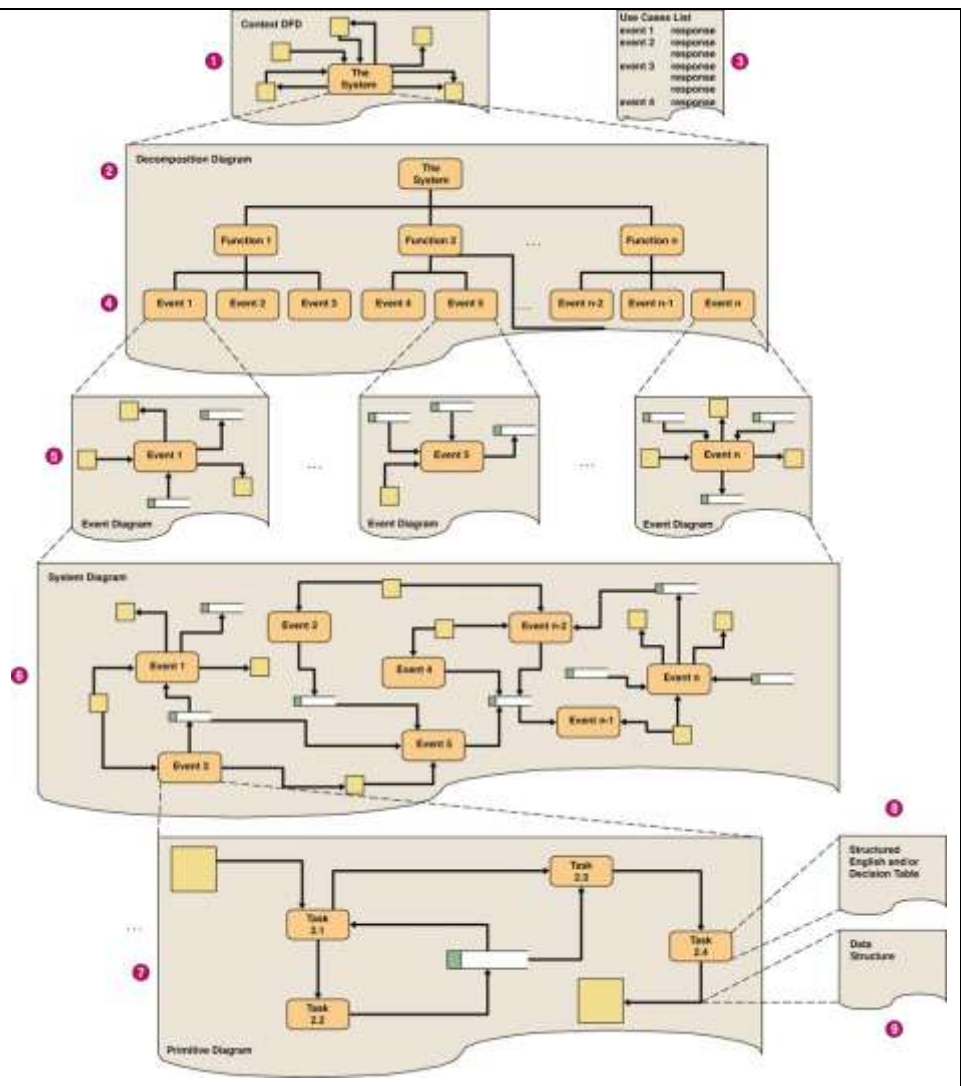
[9]

Name and explain the NINE (9) steps in the process modeling strategy. Illustrate your answer with diagrams.

Noem en verduidelik die NEGE (9) stappe in die prosesmodelleringstrategie. Illustreer jou antwoord met diagramme.

**Answer:** Refer p 335-336

1. Draw context DFD to establish initial project scope.
2. Draw functional decomposition diagram to partition the system into subsystems.
3. Create event-response or use-case list for the system to define events for which the system must have a response.
4. Add one process, called the event handler to the decomposition diagram.
5. OPTIONALLY: Draw an event DFD (or event handler) for each event.
6. Merge event DFDs into a system diagram (or, for larger systems, subsystem diagrams).
7. Draw detailed, primitive DFDs for the more complex event handlers.
8. Use Structured English & Decision Tables to represent the logic of each elementary process.
9. Represent data structures.



**Mark allocation:**

Each step  $\frac{1}{2}\sqrt{}$ , illustrated  $\frac{1}{2}\sqrt{}$

### Vraag 3 / Question 3

[8]

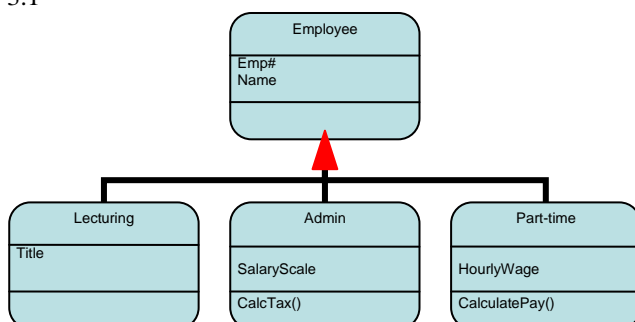
Use examples from our class / university environment to illustrate the following OBJECT relationships / *Gebruik voorbeelde vanuit ons klas- / universiteitsomgeving om die volgende OBJEK verwantskappe te illustreer:*

- 3.1 Generalisation/Specialisation / *Veralgemening/Spesialisering*
- 3.2 Composition / *Samestelling*
- 3.3 Messages (and methods) / *Boodskappe (en metodes)*
- 3.4 Polymorphism / *Polimorfisme*

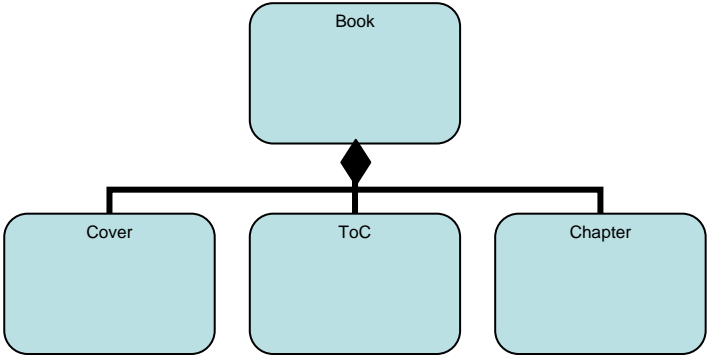
Make sure that you use the correct constructs / *Maak seker dat u die korrekte konstrakte gebruik!*

**Answer:** Refer p 373-381

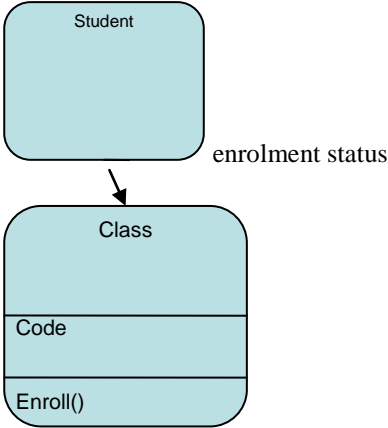
3.1



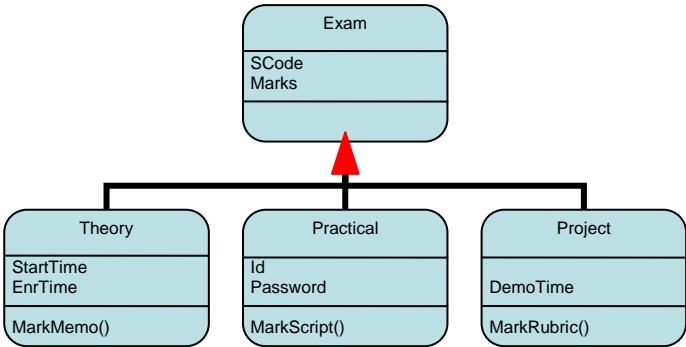
3.2



3.3



3.4



Mark allocation:

✓✓ per example