NORTH-WEST UNIVERSITY
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VAALDRIEHOEKKAMPUS

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| Benodigdhede vir hierdie vraestel / Requirements for this paper: | | | | Oopboek eksamen / Open book examination: | |
|---|---|---|---|---|---|
| Multikeusekaarte / Multi choice cards: | | Nie-programmeerbare sakrekenaar / Non-programmable calculator: | | | |
| Grafiekpapier / Graphic paper: | | Draagbare rekenaar / Laptop: | | | |

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|---|---|---|---|
| EKSAMEN / EXAMINATION: | **Tweede Geleentheid / Second Opportunity June 2013** | KWALIFIKASIE / QUALIFICATION: | **B.Sc.(IT)** |
| MODULEKODE / MODULE CODE: | **ITRW213** | DUUR / DURATION: | **3 Ure / Hours** |
| MODULE BESKRYWING / SUBJECT: | **Systems Analysis & Design I / Stelselontleding & -ontwerp I** | MAKS / MAX: | **100** |
| EKSAMINATOR(E) / EXAMINER(S): | **Imelda Smit** | DATUM / DATE: | **5/07/2013** |
| MODERATOR(E) / MODERATOR(S): | **Prof Roelien Goede** | TYD / TIME: | **14:00** |

**Answer all the questions. ★ *Beantwoord al die vrae.***

## QUESTION / VRAAG 1 [CONTEXT / KONTEKS] [20]

1.1 Draw the **Capacity Maturity Model**. Indicate each level with an explanation. **7**

1.2 **A cross-life-cycle activity** is any activity that overlaps multiple phases of the system development process. Mention them (there is four) and two of the phases in which they will be used. **6**

1.3 As a systems analyst, you will be exposed to and use **many different approaches to systems analysis** throughout your career. It is important that you understand the most important ones on a conceptual level what each one's essence is, as well as their foci and differences. To help you with this, a table has been supplied for you to complete. **7**

1.1 Teken die **Kapasiteitsgroei model**. Dui elke vlak aan met 'n verduideliking.

1.2 'n **Aktiwiteit wat die lewenssiklus kruis**, is enige aktiwiteit wat in meer as een fase van die stelselontwikkelingsproses gebruik word. Noem hulle (daar is vier) en twee van die fases waarin hulle gebruik sal word.

1.3 As stelselontleder sal jy gedurende jou loopbaan blootgestel word aan **baie verskillende benaderings tot stelselontleding** en hulle ook gebruik. Dis belangrik dat jy die belangrikstes se essensie op 'n konseptuele vlak verstaan, asook hul fokusse en verskille. Om jou hiermee te help, is die tabel saamgestel vir jou om te voltooi.

| Classification / Model-driven Analysis | CENTRICITY (it centers around -) | TYPE OF MODELS USED (maximum of two) | KEY COMPONENT (highlight essential differences) |
|---|---|---|---|
| STRUCTURED ANALYSIS | | | |
| INFORMATION ENGINEERING AND DATA MODELING | | | |
| OBJECT-ORIENTED ANALYSIS | | | |
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QUESTION / VRAAG 2 [PROJECT MANAGEMENT / PROJEKBESTUUR] **[12]**

Study project X, with the following tasks (activities), its predecessors and lengths:

Bestudeer projek X, met die volgende take (aktiwiteite), hul voorgangers en lengtes:

Tasks	Duration (day)	Predecessors
A	**3**	**None**
B	**2**	**A**
C	**2**	**A**
D	**5**	**B, C**
E	**2**	**B, C**
F	**4**	**E**

2.1 Draw an **activity-on-arrow** network diagram for project X.	**3**	2.1 Teken 'n **aktiwiteit-op-pyl** netwerk diagram vir projek X.
2.2 Indicate **all the paths** on the network diagram.	**4**	2.2 Dui **al die paaie** op die netwerkdiagram aan.
2.3 Which one is **the critical path**? Why?	**1**	2.3 Watter een is **die kritiese pad**? Hoekom?
2.4 Which tasks have **slack time**? How much slack?	**4**	2.4 Watter take het **tydspeling**? Hoeveel speling?

Question | Vraag 3 [FACT-FINDING / FEIT-INSAMELING] (13)

3.1 The **PIECES Framework** is a useful tool for classifying system requirements. List its classification topics.	3	3.1 Die PIECES Raamwerk is 'n bruikbare hulpmiddel met die klassifisering van stelselvereistes. Lys die klassifkasie-onderwerpe.
3.2 Draw a schematic representation of a **typical room lay-out for JRP**. Also include notes to explain why you include certain parties / items and why you have positioned them in the diagram.	10	3.2 Teken 'n skematiese voorstelling van **'n tipiese kameruitleg vir JRP** (Gesamentlike Vereistes Beplanning). Sluit ook notas in wat verduidelik hoekom jy sekere partye / items insluit en waarom jy hulle geplaas in die diagram.

Question | Vraag 4 [USE CASE MODELING / GEBRUIKSGEVALMODELLERING] (15)

4.1 When managing use cases, two aspects are crucially important:		4.1 Wanneer gebruikgevalle bestuur word, is twee aspekte krities belangrik:
4.1.1 **Ranking and Evaluating** use cases.	4	4.1.1 **Rangskikking en Evaluering** van gebruikgevalle,
4.1.2 **Identifying** use cases.	4	4.1.2 **Identifisering** van gebruikgevalle.
Explain these two concepts/steps. Use examples to illustrate your answer.		Verduidelik hierdie twee konsepte/stappe. Gebruik voorbeelde om die antwoord te illustreer.
4.2.1 Explain a situation that can be represented by a use-case – in a banking environment. ***TIP**: Make sure you include actors, use-cases and at least one relationship.*	3	4.2.1 Verduidelik ‘n situasie wat deur ‘n gebruiksgeval voorgestel kan word – in ‘n bankomgewing. ***Wenk**: Maak seker jy sluit akteurs, gebruiksgevalle en ten minste een verwantskap in.*
4.2.2 **Draw a use-case** to represent the explanation.	4	4.2.2 **Teken ‘n gebruiksgeval** om die verduideliking voor te stel

Question | Vraag 5 [DATA & PROCESS MODELING / DATA & PROSES MODELLERING] [25]

5.1 Study the following case study before you answer the questions:

5.1 Bestudeer die volgende gevallestudie voordat jy die vrae beantwoord:

At the NWU, we need to store data about each student, for instance; name, course enrolled, subjects passed and enrolled. Addresses (with contact numbers) are stored to be able to get hold of a student, send results and to bill a student (although billing is not included in THIS system). The system also keeps track of a student's results to be able to calculate an average at the end of the course. This determines whether a student passed with a distinction. Some subjects weigh more towards the average, some do not count towards the average.

5.1.1 **List the steps** to draw a detailed ERD	4	5.1.1 **Lys die stappe** wat gevolg moet word om 'n gedetailleerde ERD te teken.
5.1.2 **Apply the steps** to the case study.	10	5.1.2 **Pas die stappe** op die gevallestudie **toe**.
5.1.3 **List the three normal form definitions** you studied.	3	5.1.3 **Lys die drie normaalvormdefinisies** wat jy bestudeer het.
5.1.4 **Apply the normal forms to your answer** to question 5.1.2 to obtain normalised tables.	4	5.1.4 **Pas die normaalvorms op jou antwoord** op vraag 5.1.2 **toe** om genormaliseerde tabelle te verkry.

5.2 Study the following decision table to answer the questions:

5.2 Bestudeer die volgende beslissingstable om die vrae te beantwoord:

CONDITIONS	RULES			
< 12 Years and Shorter than 110cm	√	×	×	×
>12 Years and < 18 Years	×	√	×	×
> 18 Years and < 60 Years	×	×	√	×
> 60 Years	×	×	×	√
ACTIONS				
Free Admission – Only children's playpen	√	×	×	×
R10 All Access	×	√	×	×
R50 All Access	×	×	√	×
R20 All Access	×	×	×	√

5.2.1 **How much will be charged** for a family of six people with mom and dad, grandma and grandpa and two teenagers of 17 and 18?	1	5.2.1 **Hoeveel sal dit kos** vir 'n familie van ses mense met ma en pa, ouma en oupa en twee tieners van 17 en 18?
5.2.2 H**ow much will be charged** for a family of four people with mom and dad and two kids aged 10 and 12?	1	5.2.2 **Hoeveel sal dit kos** vir 'n familie van vier mense met ma en pa en twee kinders van 10 en 12?
5.2.3 Did you see any **discrepancies** in the model shown? Are there any **limitations** to the model in your opinion? Discuss this issue.	2	5.2.3 Het jy enige **teenstrydighede** in die model teëgekom? Is daar enige **beperkings** aan die model na jou mening. Bespreek die aangeleentheid.

QUESTION / VRAAG 6 [OBJECT MODELING / OBJEKMODELLERING] [15]

6.1 **Draw a class diagram** including the following classes (also include behaviours in your representation): Movie (title, producer, length, director, genre) Ticket (price, adult | child, show time, movie) Patron (name, adult | child, age)	8	6.1 **Teken 'n klasdiagram** wat die volgende klasse insluit (sluit ook die optrede in jou voorstelling in):
6.2 **Create an object diagram** (create an instance of each class) from the class diagram drawn.	4	6.2 **Skep 'n objekdiagram** (skep 'n voorkoms van elke klas) vanaf die getekende klasdiagram.
6.3 In a generalisation/specialisation relationship, would the object class of MOVIE be considered a supertype or subtype? **Draw a complete generalisation/specialisation relationship class diagram** including name, attributes and behaviours of the supertype and at least TWO subtype examples to illustrate your answer.	3	6.3 In 'n veralgemening/spesialisering verwantskap, sal die objekklas FLIEK beskou word as 'n supertipe of subtipe? **Teken 'n volledige veralgemening/spesialisering verwantskapsklasdiagram** wat naam, attribute en optredes van die supertipe insluit en ten minste TWEE subtipe voorbeelde om u antwoord te illustreer.