CMPG223 2022 Semester Test MEMO

System Analysis and Design (North-West University)

SEMESTER TEST

MODULE: CMPG223 SYSTEMS ANALYSIS AND DESIGN II

MARKS: 65 TIME: 120 MINUTES

DATE: 7 October 2022 @ 14:00

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MODERATOR: Prof Lynette Drevin

Instructions

Read the scenario below and answer all the questions:

General scenario

A hair salon maintains detail of clients, appointments and hairdressers. The owner asks you to develop a system for her business.

Instruksies

Lees die onderstaande scenario en beantwoord al die vrae:

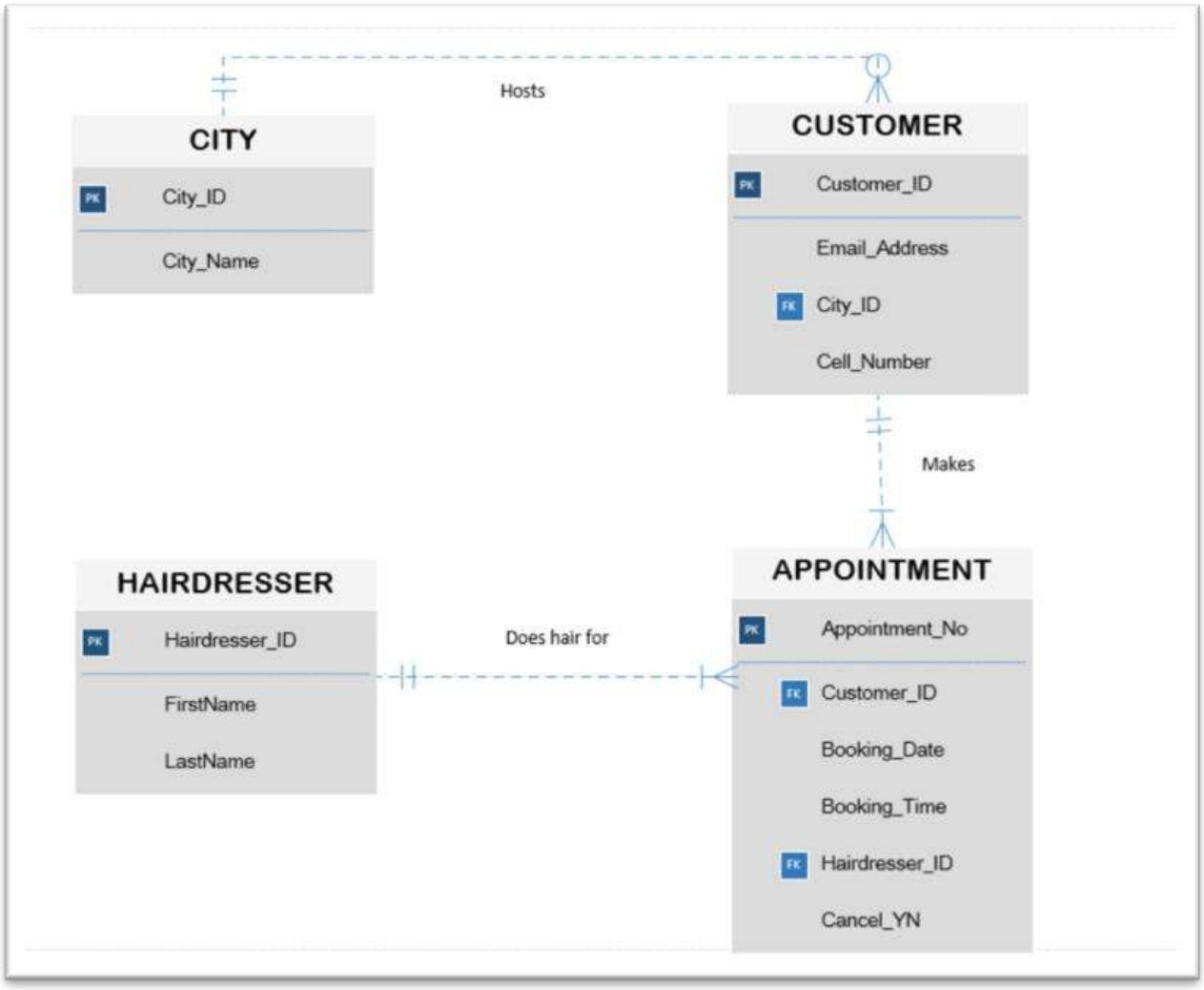
Algemene scenario

'n Haarsalon hou detail van kliënte, afsprake en haarkappers in stand. Die eienaar vra jou om 'n stelsel vir haar besigheid te ontwikkel.

Question 1 / *Vraag 1* **(12)**

Consider the logical data model of a section of a database that has to be created in SQL Server, below.

Beskou die logiese datamodel van 'n gedeelte van 'n databasis wat in SQL Server geskep moet word, onder.



a. Complete the table below. Indicate the datatypes you will use for the fields listed, when creating the physical data model for this section of the database.

Voltooi die onderstaande tabel. Dui die datatipes aan wat jy vir die gelyste velde sal gebruik tydens die skep van die fisiese datamodel vir hierdie gedeelte van die databasis. (9)

TABLE	FIELD	DATATYPE
CUSTOMER	**Customer_ID**	**A.**
CUSTOMER	**Email_Address**	**B.**
CUSTOMER	**City_ID**	**C.**
CUSTOMER	**Cell_Number**	**D.**
APPOINTMENT	**Appointment_No**	**E.**
APPOINTMENT	**Booking_Date**	**F.**
APPOINTMENT	**Booking_Time**	**G.**
APPOINTMENT	**Hairdresser_ID**	**H.**
APPOINTMENT	**Cancel_YN**	**I.**

b. Complete the table below to ensure the following referential integrity:

- Only cancelled APPOINTMENT records (Cancel_YN) are deleted once a month without any restriction.
- CUSTOMER records can always be deleted. When a CUSTOMER parent record is deleted, all children records for the specific customer must also be deleted immediately.
- The deletion of CITY parent records for which children records exists, must be restricted.
- HAIRDRESSER records can always be deleted. When a HAIRDRESSER parent record is deleted, the Foreign Key of all children records for the specific hairdresser must be updated with null values.

Voltooi die onderstaande tabel om die volgende verwysingsintegriteit te verseker:

- *Slegs gekanselleerde APPOINTMENT-rekords (Cancel_YN) word een keer per maand verwyder sonder enige beperkings.*
- *CUSTOMER rekords kan altyd verwyder word. Wanneer 'n CUSTOMER-ouerrekord verwyder word, moet alle kinderrekords vir die spesifieke kliënt ook onmiddellik verwyder word.*
- *Die verwydering van CITY-ouerrekords waarvoor kinderrekords bestaan, moet beperk word.*
- *HAIRDRESSER-rekords kan altyd verwyder word. Wanneer 'n HAIRDRESSER-ouerrekord verwyder word, moet die vreemde sleutel van alle kinderrekords vir die spesifieke haarkapper met leë (null) waardes opdateer word.* (3)

RELATIONSHIP **VERWANTSKAP**	**REFERENTIAL INTEGRITY FOR PARENT ENTITY** **VERWYSINGSINTEGRITEIT VIR OUER ENTITEIT**	**REFERENTIAL INTEGRITY FOR CHILD ENTITY** **VERWYSINGSINTEGRITEIT VIR KIND ENTITEIT**
CITY hosts CUSTOMER	**A.**	**B.**
CUSTOMER makes APPOINTMENT	**C.**	**D.**
HAIRDRESSER does hair for APPOINTMENT	**E.**	**F.**

Question a (9)

TABLE	FIELD	DATATYPE
CUSTOMER	**Customer_ID**	**A.**Int IDENTITY (1,1) ✓
CUSTOMER	**Email_Address**	**B.**Varchar(55) ✓
CUSTOMER	**City_ID**	**C.**int✓
CUSTOMER	**Cell_Number**	**D.**Char(13) ✓
APPOINTMENT	**Appointment_No**	**E.**Int IDENTITY (1,1) ✓

APPOINTMENT	**Booking_Date**	**F.**date✓
APPOINTMENT	**Booking_Time**	**G.**time✓
APPOINTMENT	**Hairdresser_ID**	**H.**int✓
APPOINTMENT	**Cancel_YN**	**I.**Bit or char(1) ✓

Question b (3)

RELATIONSHIP	REFERENTIAL INTEGRITY FOR PARENT ENTITY	REFERENTIAL INTEGRITY FOR CHILD ENTITY
CITY hosts CUSTOMER	**A.**D:R✓½	**B.**D:NONE✓½
CUSTOMER makes APPOINTMENT	**C.**D:C✓½	**D.**D:NONE✓½
HAIRDRESSER does hair for APPOINTMENT	**E.**D:SN✓½	**F.**D:NONE✓½

Question 2 / *Vraag 2* **(15)**

Make use of the given data model and draw a physical DFD (process model) for a system to be developed in Visual Studio, Windows 10 and database in SQL Server to do the following:

a. After a customer has not made an appointment for two years, the involved customer's historical appointment information will be removed from the database.
b. Customers usually call to make an appointment with a specific hairdresser. Sometimes it happens that a customer moves or cancels (Cancel_YN) an appointment.
c. Cancelled appointment information (Cancel_YN) are deleted once a month.
d. Reports on all the information in the database are required.
e. The secretary has access to all the above functions of the system. The manager has access to all reports.

Maak gebruik van die gegewe datamodel en teken 'n fisiese DFD (prosesmodel) vir 'n stelsel wat in Visual Studio, Windows 10 en databasis in SQL Server geskryf moet word om die volgende te doen:

a. Nadat 'n kliënt vir twee jaar nie 'n afspraak gemaak het nie, word die betrokke kliënt se historiese afspraak-inligting uit die databasis verwyder.
b. Kliënte bel gewoonlik om 'n afspraak by 'n spesifieke haarkapper te maak. Soms gebeur dit dat 'n kliënt 'n afspraak skuif of kanselleer (Cancel_YN).
c. Gekanselleerde afspraakinligting (Cancel_YN) word een keer per maand verwyder.
d. Verslae oor al die inligting in die databasis is nodig.
e. Die sekretaresse het toegang na alle bogenoemde funksies in die stelsel. Die bestuurder het toegang tot alle verslae.

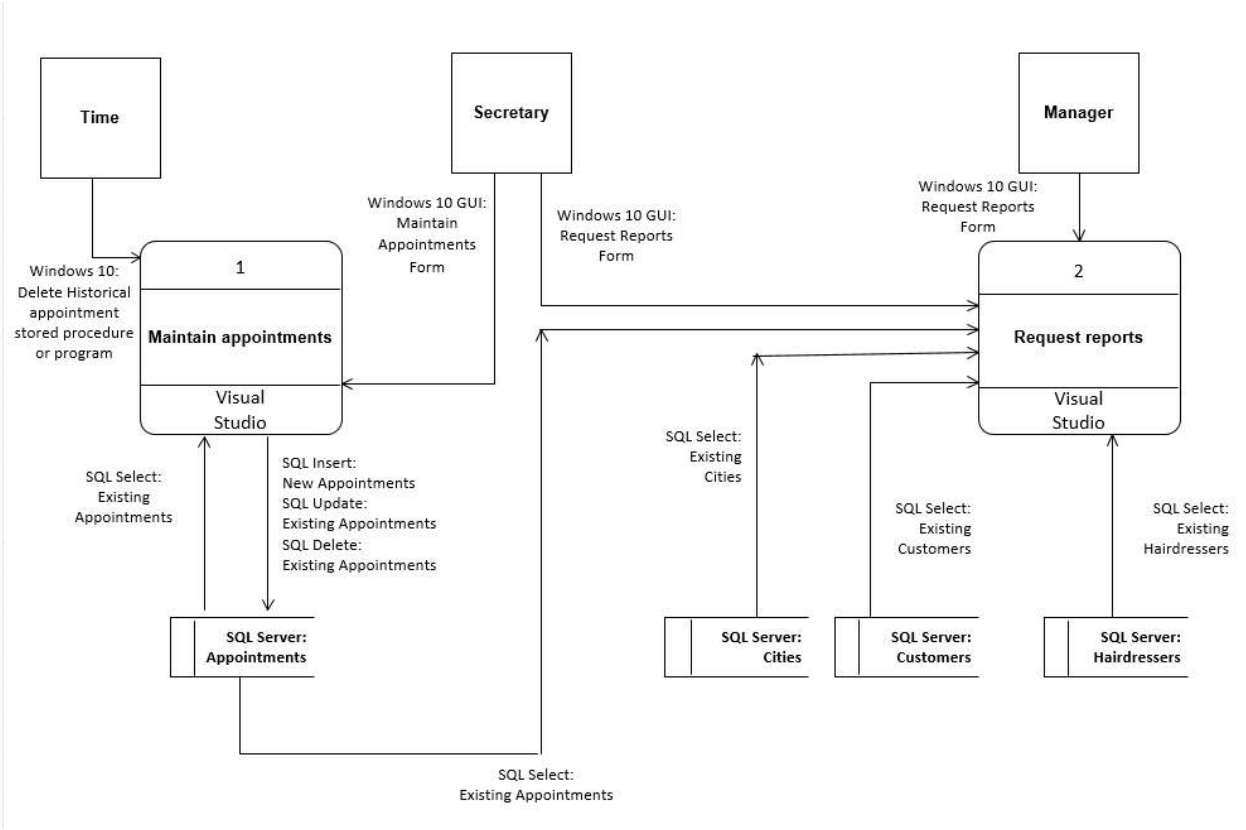
Question 2 (15)

Agents (**2**) (Time(1), Secretary (½), Manager (½))

Processes (1)

Datastores (2**)**

Data Flows (10)



Question 3 / ***Vraag 3*** **(15½)**

Draw an object oriented (OO) analysis class diagram for the scenario described in the previous questions. Obtain the attributes of classes and associations between classes from the data model in Question 1 and the methods as described in Question 2. Please note that attributes can only be accessed by methods of their own class while methods can be accessed by methods in own and other classes.

Teken 'n objekgeoriënteerde ontledingsklasdiagram vir die scenario beskryf in die vorige vrae. Verkry die attribute van klasse en die assosiasies tussen klasse uit die datamodel in Vraag 1 en die metodes soos beskryf in Vraag 2. Let daarop dat attribute slegs toeganklik is vir metodes in hul eie klas terwyl metodes toeganklik is vir metodes in eie en ander klasse.

Question 3 (15½)

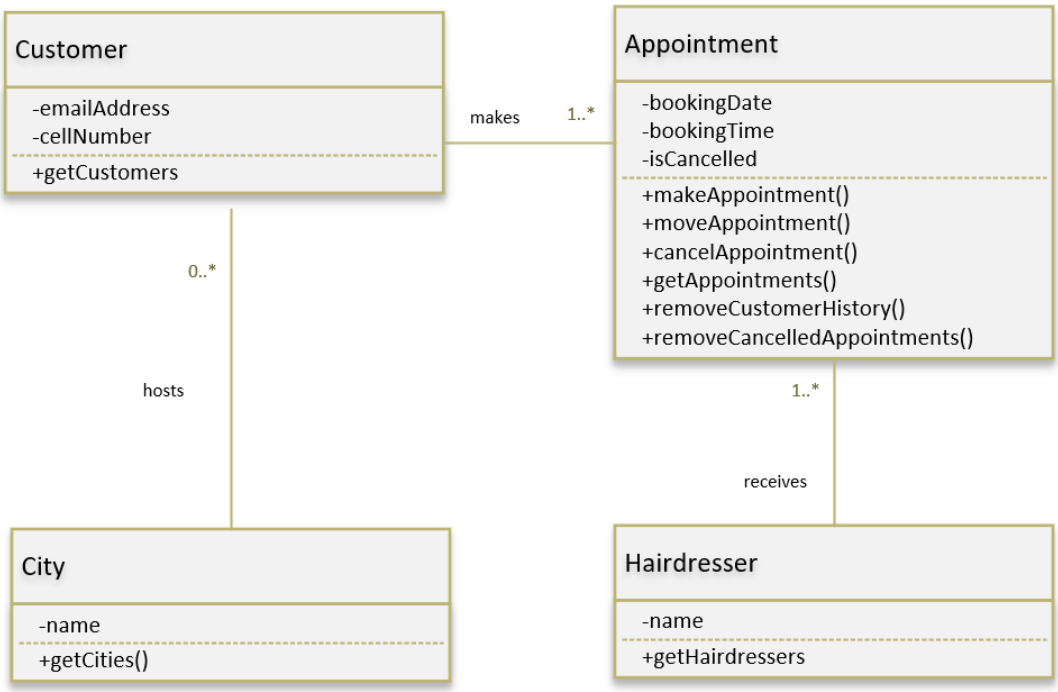
Classes (2)

Attributes (4)

Methods (4½)

Associations (3)

Visibility (2)



Question 4 / ***Vraag 4*** **(13)**

a. Use the layout of the Appointment table in your physical data model in Question 1 and draw the layout of a Windows GUI form to add a new appointment. Indicate all controls to be used for input. Ensure to apply all input design guidelines that you have learned during the semester.

Gebruik die uitleg van die Appointment tabel in jou fisiese datamodel in Vraag 1 en teken die uitleg van 'n Windows GUI-vorm om 'n nuwe afspraak by te voeg. Dui alle kontroles wat vir invoer gebruik moet word, aan. Maak seker dat jy alle toevoerontwerp riglyne wat jy gedurende die semester geleer het, toepas. (8)

b. Give and explain ONE technique that can be used to validate data for the form designed in Question 4a?

Gee en verduidelik EEN tegniek wat gebruik kan word om data in die vorm wat in Vraag 4a ontwerp is, te valideer. (2)

c. Evaluate whether the following messages comply with the guidelines for tone and terminology of dialogue (Yes/No). Motivate each of your answers.

Evalueer of die volgende boodskappe aan die riglyne vir toon en terminologie van dialoog voldoen (Ja/Nee). Motiveer telkens jou antwoord. (3)

I. An information message: Well done! The appointment is saved.

'n Inligtingsboodskap: Wel gedaan! Die afspraak is gestoor.

II. An information message: Choose a date and time for the appointment.

'n Inligtingsboodskap: Kies 'n datum en tyd vir die afspraak.

Question a (8)

No unnecessary data to enter (2)

Title for form (1)

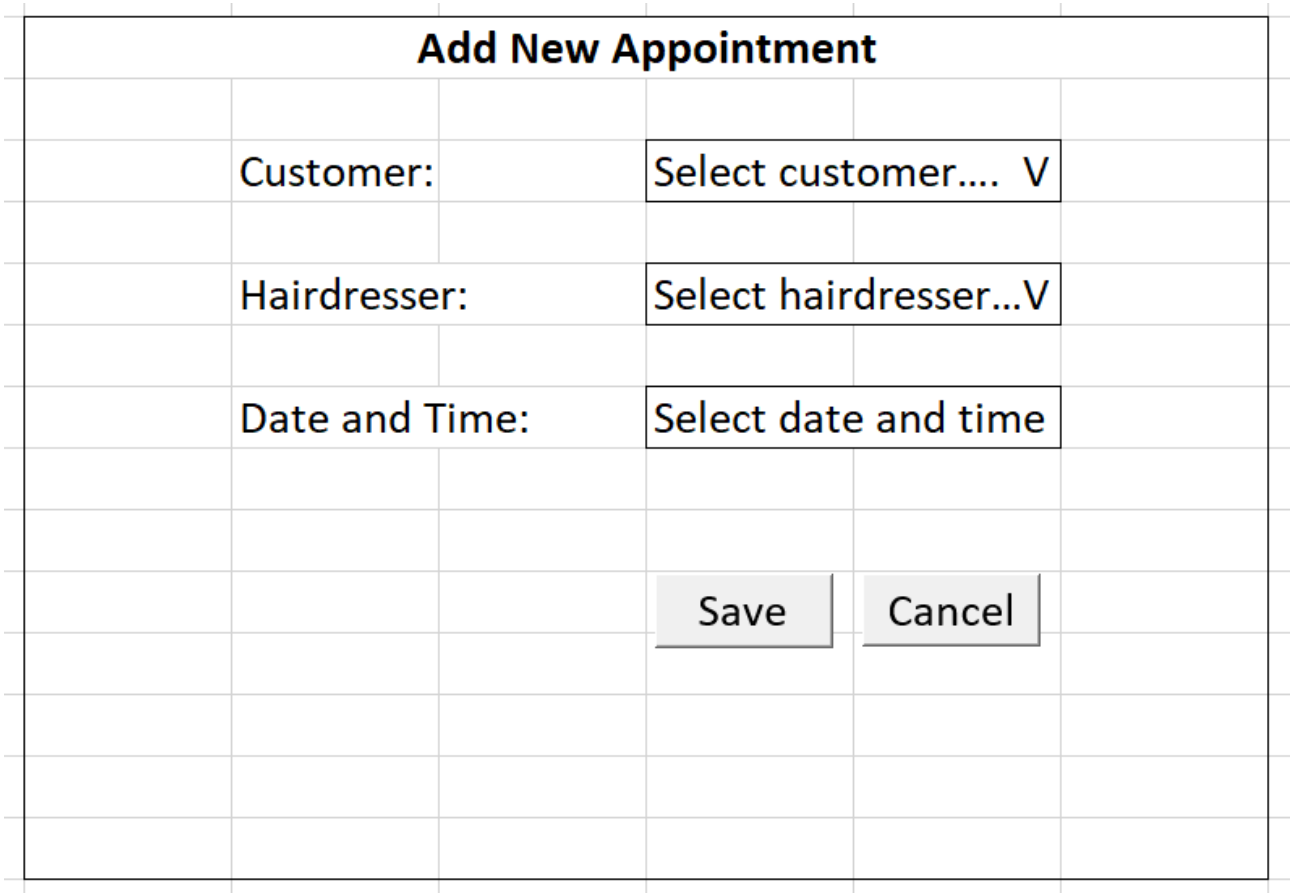
Control to select customer e.g. combobox (1)

Control to select hairdresser e.g. combobox (1)

Control to select date and time e.g. date and time picker (1)

Save button (1)

Cancel button (1)



Question b (2)

Existence checks (1)
Explanation that all data in the form must be entered (1)

Question c (3)

I. No. (½) condescending (minagtend) (1)
II. Yes. (½) Any of the following: simple, grammatically correct sentence; not funny or cute; not condescending; no computer jargon; no abbreviations; (1)

Question 5 / *Vraag 5* **(9½)**

a. Use your physical data model in Question 1 and draw the layout of a report to be requested per time period (from a start date to an end date) that shows the number of appointments per hairdresser per week. Also, show the total number of appointments per hairdresser as

well as a grand total for the number of appointments for the time period of the report. Ensure to apply all output design guidelines that you have learned during the semester.

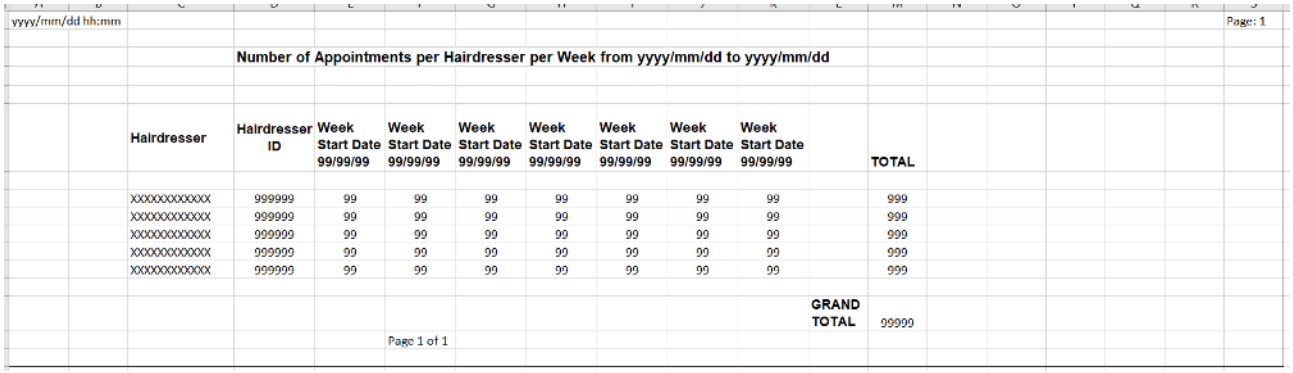
Gebruik jou fisiese datamodel in Vraag 1 en teken die uitleg van 'n verslag wat aangevra moet word per tydperk (van 'n begindatum tot 'n einddatum) wat die aantal afsprake per haarkapper per week toon. Toon ook die totale aantal afsprake per haarkapper sowel as 'n groottotaal vir die aantal afsprake vir die tydperk van die verslag. Maak seker dat jy alle afvoerontwerp riglyne wat jy gedurende die semester geleer het, toepas.

b. Give the logical data structure for the report in Question 5a.

Gee die logiese datastruktuur vir die verslag in Vraag 5a. (3½)

Question 5a (6)

12 X ½ = 6



yyyy/mm/dd hh:mm Page: 1

Number of Appointments per Hairdresser per Week from yyyy/mm/dd to yyyy/mm/dd

Hairdresser	Hairdresser ID	Week Start Date 99/99/99	Week Start Date 99/99/99	Week Start Date 99/99/99	Week Start Date 99/99/99	Week Start Date 99/99/99	Week Start Date 99/99/99	Week Start Date 99/99/99		TOTAL
XXXXXXXXXXX	999999	99	99	99	99	99	99	99		999
XXXXXXXXXXX	999999	99	99	99	99	99	99	99		999
XXXXXXXXXXX	999999	99	99	99	99	99	99	99		999
XXXXXXXXXXX	999999	99	99	99	99	99	99	99		999
XXXXXXXXXXX	999999	99	99	99	99	99	99	99		999
									GRAND TOTAL	99999

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Question 5b (3½)

REPORT = REPORT TITLE

+ START DATE

+ END_DATE, **(1)**

+ 1 { WEEK_START_DATE} N

+1{ HAIRDRESSER NAME + HAIRDRESSER_ID

+ 1{ WEEK_TOTAL APPOINTMENTS}N **(1)**+ HAIRDRESSER_TOTAL_APPOINTMENTS_FOR PERIOD} N **(1)**

+ GRAND TOTAL**(½)**

TOTAL/TOTAAL: 65

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