



NORTH-WEST UNIVERSITY
YUNIBESITHI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOMKAMPUS

Benodigdhede vir hierdie vraestel:

Multikeusekaarte: ☐

Nie-programmeerbare sakrekenaar: ☒

Grafiekpapier: ☐

Draagbare rekenaar: ☐

Oopboek eksamen: ☐

EKSAMEN: EERSTE GELEENTHEID

EXAM: FIRST OPPORTUNITY

MODULEKODE: REII413

MODULE CODE:

MODULEBESKRYWING: Ingenieursprogrammering II

MODULE DESCRIPTION: Programming for Engineers II

KWALIFIKASIE: B.Ing. R/E

QUALIFICATION:

DUUR: 180 minute

DURATION: 180 minutes

MAKS: 120 punte

MAX: 120 marks

EKSAMINATOR: AJ Alberts

EXAMINER:

DATUM: 13-06-2015

DATE:

TYD: 09:00

MODERATOR: SS Cox

TIME:

Vraag 1 / Question 1

Beantwoord die volgende vrae:

Answer the following questions:

- (a) Watter eienskappe maak 'n kandidaat primêre sleutel 'n goeie keuse vir gebruik?
What properties make a candidate primary key a good choice for use? (5)
- (b) Wat is die verskil tussen 'n ryvlak sneller en 'n tabelvlak sneller?
What is the difference between a row level trigger and a table level trigger? (2)
- (c) Hoe werk SQL inspuiting?
How does SQL injection work? (3)
- (d) Gee 'n voorbeeld van 'n oortollige verwantskap in 'n EVD.
Give an example of a redundant relationship in an ERD. (2)

Totaal vir Vraag 1/ Total for Question 1: 12

Vraag 2 / Question 2

Beskou die tabelle CUSTOMER en AGENT:

Consider the tables CUSTOMER and AGENT:

CUSTOMER			
CUS_CODE	CUS_LNAME	CUS_ZIP	AGENT_CODE
1132445	Walker	32145	231
1217782	Adares	32145	125
1312243	Rakowski	34129	167
1321242	Rodriguez	37134	125
1542311	Smithson	37134	421
1657399	Vanloo	32145	231

AGENT	
AGENT_CODE	AGENT_PHONE
125	6152439887
167	6153426778
231	6152431124
333	9041234445

(a) Vertoon hierdie tabelle entiteitsintegriteit? Hoekom?
Do these tables exhibit entity integrity? Why? (3)

(b) Vertoon hierdie tabelle verwysingsintegriteit? Hoekom?
Do these tables exhibit referential integrity? Why? (2)

(c) Wat sal die afvoer van die volgende SQL stelling wees:
What will the output of the following SQL statement be:

```
1 select distinct(CUS_ZIP) zip , count(*) n from CUSTOMER
2 group by CUS_ZIP
3 order by n desc , zip asc
```

(6)

(d) Verskaf die uitset van 'n natuurlike samevoeging van CUSTOMER en AGENT op AGENT_CODE
Provide the output of a natural join of CUSTOMER and AGENT on AGENT_CODE (6)

Totaal vir Vraag 2/ Total for Question 2: 17

Vraag 3 / Question 3

Teken 'n entiteitsverwantskapsdiagram van die volgende relasionele databasis:

Draw an entity relationship diagram of the following relational database:

EMPLOYEE_PLAN		EMPLOYEE		
EMP_CODE	PLAN_CODE	EMP_CODE	EMP_LNAME	JOB_CODE
15	2	14	Rudell	2
15	3	15	McDade	1
16	1	16	Ruellardo	1
17	1	17	Smith	3
17	3	20	Smith	2
17	4			
20	3			

PLAN		JOB	
PLAN_CODE	PLAN_DESCRIPTION	JOB_CODE	JOB_DESCRIPTION
1	Term life	1	Clerical
2	Stock purchase	2	Technical
3	Long-term disability	3	Managerial
4	Dental		

(10)

Totaal vir Vraag 3/ Total for Question 3: 10

Vraag 4 / Question 4

Beskou die tabel PROJECTS en antwoord die vrae wat volg:

Consider the table PROJECTS and answer the questions that follow:

PROJECTS				
PROJ_ID	PROJ_NAME	CUST_ID	STARTDATE	CUST_NAME
1	Moonshine	1	01-01-1900	Pascal
1	Moonshine	2	03-01-1901	Babbage
2	Silver Fern	1	06-09-1904	Pascal

- (a) Teken die afhanklikheidsdiagram van die data in die tabel.

Draw the dependency diagram of the data in the table.

(4)

- (b) Normaliseer die tabel tot die derde normaalvorm.

Normalise the table to the third normal form.

(9)

Totaal vir Vraag 4/ Total for Question 4: 13

Vraag 5 / Question 5

Beskou die tabelle CUSTOMER, INVOICE, LINE en PRODUCT en antwoord die vrae wat volg:

Consider the tables CUSTOMER, INVOICE, LINE and PRODUCT and answer the questions that follow:

CUSTOMER				
CUS_CODE	CUS_LNAME	CUS_FNAME	CUS_PHONE	CUS_BALANCE
10010	Ramas	Alfred	844-2573	0
10011	Dunne	Leona	894-1238	0
10012	Smith	Kathy	894-2285	345.86
10013	Olowski	Paul	894-2180	536.75
10014	Orlando	Myron	222-1672	0
10015	O'Brian	Amy	442-3381	0
10016	Brown	James	297-1228	221.19
10017	Williams	George	290-2556	768.93
10018	Farriss	Anne	382-7185	216.55
10019	Smith	Olette	297-3809	0

INVOICE					
INV_NUMBER	CUS_CODE	INV_DATE	INV_SUBTOTAL	INV_TAX	INV_TOTAL
1001	10014	1/16/2006	24.9	1.99	26.89
1002	10011	1/16/2006	9.98	0.8	10.78
1003	10012	1/16/2006	153.85	12.31	166.16
1004	10011	1/17/2006	34.97	2.8	37.77
1005	10018	1/17/2006	70.44	5.64	76.08
1006	10014	1/17/2006	397.83	31.83	429.66
1007	10015	1/17/2006	34.97	2.8	37.77
1008	10011	1/17/2006	399.15	31.93	431.08

- (a) Skryf 'n SQL stelling wat elke kliënt se naam, van, balans en totale bedrag aankope sal lewer.

Write an SQL statement that will provide each client's name, surname, balance and total amount purchased.

(5)

- (b) Skryf 'n SQL stelling wat die naam, van en bedrag van die item van die klant wat die duurste item gekoop het, sal lys.

Write an SQL statement that will list the name, surname and invoiced amount of the item for the customer who bought the most expensive item.

(6)

LINE					
INV_NUMBER	LINE_NUMBER	P_CODE	LINE_UNITS	LINE_PRICE	LINE_TOTAL
1001	1	13-Q2/P2	1	14.99	14.99
1001	2	23109-HB	1	9.95	9.95
1002	1	54778-2T	2	4.99	9.98
1003	1	2238/QPD	1	38.95	38.95
1003	2	1546-QQ2	1	39.95	39.95
1003	3	13-Q2/P2	5	14.99	74.95
1004	1	54778-2T	3	4.99	14.97
1004	2	23109-HB	2	9.95	19.9
1005	1	PVC23DRT	12	5.87	70.44
1006	1	SM-18277	3	6.99	20.97
1006	2	2232/QTY	1	109.92	109.92
1006	3	23109-HB	1	9.95	9.95
1006	4	89-WRE-Q	1	256.99	256.99
1007	1	13-Q2/P2	2	14.99	29.98
1007	2	54778-2T	1	4.99	4.99
1008	1	PVC23DRT	5	5.87	29.35
1008	2	WR3/TT3	3	119.95	359.85
1008	3	23109-HB	1	9.95	9.95

PRODUCT				
P_CODE	P_DESCRIPTOR	P_PRICE	P_DISCOUNT	P_QOH
11QER/31	Power painter, 15 psi., 3-nozzle	109.99	0.00	34
13-Q2/P2	7.25-in. pwr. saw blade	14.99	0.05	3
14-Q1/L3	9.00-in. pwr. saw blade	17.49	0.00	19
1546-QQ2	Hrd. cloth, 1/4-in., 2x50	39.95	0.00	102
1558-QW1	Hrd. cloth, 1/2-in., 3x50	43.99	0.00	332
2232/QTY	B&D jigsaw, 12-in. blade	109.92	0.05	21
2232/QWE	B&D jigsaw, 8-in. blade	99.87	0.05	33
2238/QPD	B&D cordless drill, 1/2-in.	38.95	0.05	2
23109-HB	Claw hammer	9.95	0.10	12
23114-AA	Sledge hammer, 12 lb.	14.4	0.05	4
54778-2T	Rat-tail file, 1/8-in. fine	4.99	0.00	54
89-WRE-Q	Hicut chain saw, 16 in.	256.99	0.05	25
PVC23DRT	PVC pipe, 3.5-in., 8-ft	5.87	0.00	72
SM-18277	1.25-in. metal screw, 25	6.99	0.00	30
SW-23116	2.5-in. wd. screw, 50	8.45	0.00	39
WR3/TT3	Steel matting, 4'x8'x1/6, .5" mesh	119.95	0.10	5

- (c) Skryf 'n SQL stelling wat die vyf produkte met die grootste totale voorraadwaarde in afnemende volgorde sal lys.

Write an SQL statement that will list the five products with the largest total stock value in descending order.

(5)

- (d) Wat sal die afvoer van die volgende SQL stelling wees? Gee u antwoord in tabelformaat. *What will the output of the following SQL statement be? Give your answer in table format.*

```

1 select distinct CUSFNAME, CUSLNAME, INVOICE.INV_NUMBER, sum(LINE.TOTAL -
   LINE_UNITS * P_PRICE * (1-P_DISCOUNT)) as DISCOUNT
2 from PRODUCT, LINE, INVOICE, CUSTOMER
3 where INVOICE.CUS_CODE = CUSTOMER.CUS_CODE and INVOICE.INV_NUMBER = LINE.
   INV_NUMBER and PRODUCT.P_CODE = LINE.P_CODE
4 group by INV_NUMBER
5 having DISCOUNT > 10

```

(10)

- (e) Skep 'n sneller wat outomaties die hoeveelheid voorraad P.QOH in die PRODUCT tabel sal opdateer wanneer 'n verkoopsfaktuur gegenereer word.

Create a trigger that automatically updates the quantity of stock P.QOH in the PRODUCT table when a sales invoice is generated.

(6)

- (f) Gegee die sneller in (e), hoe kan mens seker maak dat die hoeveelheid voorraad konsekwent bly wanneer 'n transaksie gekanselleer word? Voorsien u antwoord in die vorm van 'n stukkies SQL kode.

Given the trigger in (e), how can one ensure that the quantity of stock stays consistent when a transaction is cancelled? Provide your answer as a piece of SQL code.

(6)

Totaal vir Vraag 5/ Total for Question 5: 38

Vraag 6 / Question 6

Hoe sou u 'n webgebaseerde sagtewarestelsel wat die finalejaarsprojek by 'n ingenieursfakulteit bestuur, ontwerp?

Studieleiers moet op die sisteem projekte kan definieer en toeken aan studente. Projekte word beskikbaar gemaak soos wat hulle ingevoer word. Studente moet die lys beskikbare projekte kan besigtig en skiet vir 'n projek. Projekte waarvoor geskiet is, word onbeskikbaar. Studieleiers kan aansoek goedkeur of verwerp. Deur die loop van die jaar moet die kursus-administrateur mylpale kan definieer vir projekstudente. Studente moet lëers kan oplaai vir hierdie mylpale, en dosente moet hulle eie projekstudente studente se opgelaaide lëers kan navigeer en aflaai en volgens 'n gespesifiseerde merkstaat vir elke mylpaal evalueer. Tydens projektedag self moet beoordelaars ook die stelsel kan gebruik en aan die studente wat administratief toegeken is aan hulle beoordelaarsgroep kan punte gee vir hulle projek, plakaat en aanbidding. Interne en eksterne eksaminators moet studente wat aan hulle toegeken word se finale mylpaal, die projekverslag, kan evalueer. Persone kan, maar hoef nie, meer as een rol te vervul nie, byvoorbeeld projekleier, interne eksaminator, eksterne eksaminator of projektedag beoordelaar.

Teken 'n entiteitsverwantskapsdiagram wat die verwantskappe tussen die verskillende databasistabelle wat u sou gebruik aandui.

Verduidelik ook hoe die informasievloei in die stelsel gaan werk tussen die gebruiker se webblaaier en u sisteem, asook tussen die substelsels in u sisteem.

How would you design a web based software system that manages the final year project at an engineering faculty?

Study leaders must be able to define projects on the system and assign them to students. Projects are made available as they are defined. Students must be able to view the list of available projects and apply for a project. Projects applied for become unavailable. Study leaders may accept or reject applications. Through the course of the year, the course administrator must be able to define milestones for project students. Students must be able to upload files for these milestones, and lecturers must be able to browse and download their own project students' uploaded files and assess them according to a specified mark sheet for each milestone. During project day, adjudicators must also be able to use the system and assess the students administratively assigned to their group on their project, poster and presentation. Internal and external examiners must be able to assess the final milestone, the project report, of students assigned to them. Persons may, but are not required to, fulfill more than one role, for example project leader, internal examiner, external examiner, or project day adjudicator.

Draw an entity relationship diagram that shows the relationships between the different tables you would use.

Explain the information flow in the system between the user's web browser and your system, as well as the subsystems within your system.

(30)

Totaal vir Vraag 6/ Total for Question 6: 30

TOTAAL / TOTAL : 120