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VAALDRIEHOEKKAMPUS

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Requirements for this paper:					
Multi choice cards:		Non-programmable calculator:		Open book examination:	
Graphic paper:		Laptop:			

EXAMINATION:	**Special Examination June 2016**	QUALIFICATION:	**B.Sc.(IT)**
MODULE CODE:	**ITRW213**	DURATION:	**3 Hours**
MODULE SUBJECT:	**Systems Analysis & Design I**	MAX:	**100**
EXAMINER(S):	**Imelda Smit**	DATE:	**17/06/2016**
MODERATOR(S):	**Prof Roelien Goede**	TIME:	**09:00**

Answer all the questions.

Read the case study before answering the questions:

Question 1 [CONTEXT] [10]

1.1 A systems analyst must be both technically proficient and capable of communicating successfully with customers. Developing a good system requires a complete understanding of user requirements. Many times users do not know what is available (technologically) or even what they would like from a system. What are characteristics of good communication? Discuss this notion. (5)

1.2 Name 5 technology drivers for today's information systems. (5)

Question 2 [PROJECT MANAGEMENT] [16]

2.1 Because of the time constraints of your project, you want to complete it in the shortest time possible. The required information to draw a PERT chart is shown in the table below. Draw an activity-on-node PERT chart. (5)

Tasks	Duration (week)	Predecessors
A	1	None
B	2	None
C	1	None
D	4	A
E	5	B
F	1	C,D
G	6	A,E
H	4	F
I	2	G,H

2.2 Indicate the different paths, with the number of weeks for each path. (4)

2.3 Also indicate the critical path. (1)

2.4 How long will it take for this project to be completed? (1)

2.5 Is it important in business to understand CPA or is it just theoretical knowledge? (2)

2.6 Indicate the paths and activities with slack time. Also indicate the number of weeks for each path/activity. (3)

Question 3 [FACT-FINDING] [15]

3.1 Draw a schematic representation of a typical room lay-out for JRP. Also include notes to explain why you include certain stakeholders, as well as items and why you have positioned them where they are in the diagram. (15)

Question 4 [USE CASE MODELLING] [15]

Study the following case study:

Kunsan Hanvit Inc. is a small custom manufacturing firm located in Kunsan South Korea. When Chung-Hee Ko, the owner, first brought computers into the business office, the firm was very small and simple. He was able to use an inexpensive PC-based accounting system to handle the basic information-processing needs of the firm. As time went on, the firm grew and the work has become much more complex. The firm's business contracts are as complex as the custom products it manufactures. The simple accounting software is no longer able to keep track of many of the company's sophisticated contracts with its customers.

Mr Ko has a staff of four in the business office who are familiar with the intricacies of the company's record-keeping requirements. He recently discussed with his staff his plan to hire an information system (IS) consultancy to evaluate Kunsan Hanvit's IS needs and proposes an upgrading of its computer system. The staff is excited about the prospect of a new system, because the current system has caused much aggravation. However, they are wary of the consultants who will be conducting the project.

Assume that you are a systems analyst on the consulting team assigned to the Kunsan Hanvit Inc. project.

4.1 Compile an actor glossary for the case study. Include the following headings; term, synonym, and description. (4)

4.2 Draw a system use-case diagram with only the basic use-cases (3-4 functions/systems) and actors (3-4 roles). (6)

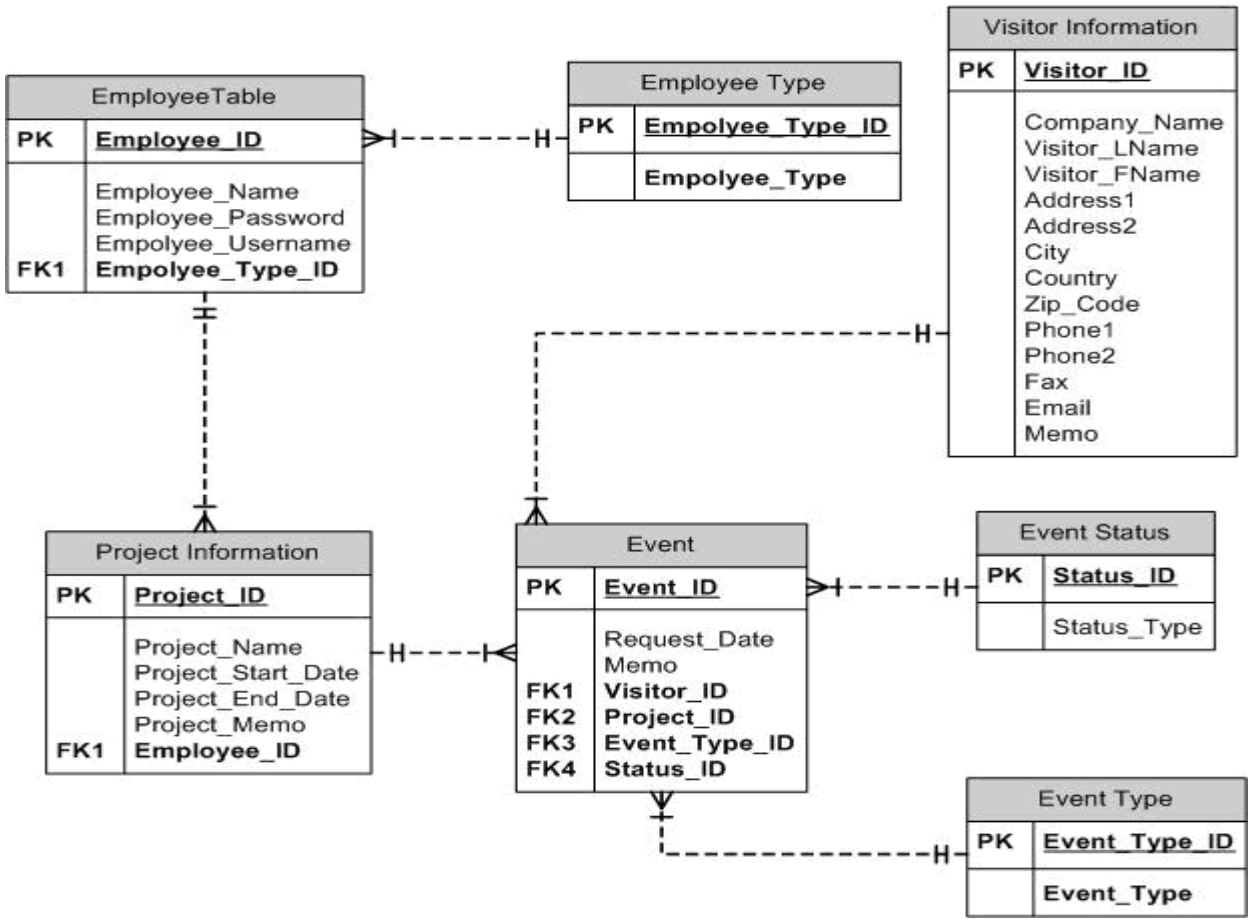
4.3 A use case ranking and priority matrix is a tool used to evaluate use cases and determine their priority. Explain use case ranking and priority matrixes. (5)

Question 5 [DATA & PROCESS MODELLING] [26]

5.1 Study the fully attributed ERD supplied. Explain each of the following concepts and identify an example of each from the ERD:

- Associative (bridge) entity
- Foreign key
- Sub-setting criteria
- Default value
- Candidate key
- Alternate key
- N-ary relationship
- ISA relationship

(16)



5.2 Use the steps to do process modelling listed below to guide you to draw an event decomposition diagram. *The interview listed in appendix A may help you.* (10)

Process modelling steps:

1. Draw context DFD
2. Draw functional decomposition diagram
3. Create event-response or use-case list
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
8. Use Structured English & Decision Tables
9. Represent data structures

Question 6 [FEASIBILITY ANALYSIS & THE SYSTEM PROPOSAL] [17]

A web-based system you are designing, has an estimated:

- Development cost of: R500,000
- Operation and maintenance cost of:

  Year 1 = R15,000; Year 2 = R16,000; Year 3 = R17,000; Year 4 = R18,000
- Benefits from using the system of:

  Year 1 = R150,000; Year 2 = R160,000; Year 3 = R170,000; Year 4 = R180,000

6.1.1 Explain the time value of money. (2)

6.1.2 Work on a 5% interest rate and calculate the present value per rand per year. The empty table is supplied to assist your answer. Supply the formula you use. (5)

6.1.3 Do a payback analysis for the system. Use the costs/benefits given. The empty table on the answer sheet is supplied to assist your answer. (5)

6.1.4 What is the payback period? (1)

6.1.5 In your opinion, is the system feasible? (1)

6.2 Supply general guidelines on limiting report size to the following levels:

- Executive level managers
- Middle level managers
- Supervisory level managers
- Clerk-level personnel

(3)

Mention 2 two guidelines you would follow when writing reports to the mentioned levels.

APPENDIX A

Scene: ***Kira Webster**, systems analyst, is meeting with **Jack Mills**, Vice President of Human Resources for A-1 Information Systems, at his office. Ms. Webster scheduled the interview with Mr. Mills in response to his request for developing a new system to house employee information.*

Jack:	Good Morning! You must be Kira Webster.
Kira:	Yes, I am sir. Are you Mr. Jack Mills?
Jack:	Yes. Please call me Jack. I'm glad we could get together today. Things are quite chaotic around here.
Kira:	What do you mean?
Jack:	Our executive steering committee is very anxious to set in motion our plan for reengineering and modernizing our systems and computing resources. The first phase of that plan concentrates on Human Resources, and that is why you are here.
Kira:	That's sounds like an enormous task, but I love challenges.
Jack:	It is monumental, but we tried to simplify the task by breaking it up into smaller pieces. The first piece deals with the **tracking and management of employee information**.
Kira:	What is your current system like?
Jack:	My Employee Relations manager, **Dotty Jones**, who by the way will be your key user contact, explained the process in detail to me yesterday. I don't interact with it myself, but it appears there are **a lot of inefficiencies and its operating costs are exorbitant**. The system itself is a **combination of manual and automated processes**.
Kira:	Will this system replace all the legacy systems?
Jack:	Not all of them initially. That is too big and risky of an effort.
Kira:	Could you please describe for me the **business processes** that will be included in the system?
Jack:	I think the best way to explain the process is to start from the beginning. The first day employees report to work they go through an orientation program. During that program they are required to complete some personnel forms that include information such as addresses, phone numbers, emergency contact information, and beneficiary information. They can also elect to have various things deducted from their paychecks, including United Way donations, parking, extra life insurance, and the pre-tax medical reimbursement plan. This data is then input into the legacy mainframe system by one of my administrators. This is a COBOL-based system using, in my opinion, obsolete database and file technology. I say that because every time another system needs employee data, we have to send them a sequential file sometimes daily, weekly, or monthly. So we have multiple copies of employee information throughout our systems, which may or may not be in sync.
Kira:	What do you mean by that?
Jack:	If employees need to change any of their personal information that we have on file, they must complete a form and submit it to us to be input into the system. Currently, it could be weeks before that change gets distributed across all the necessary systems. This is especially critical for payroll. People aren't very happy if they don't receive their checks on time because they have moved and the payroll system doesn't have their current address.
Kira:	I can understand that concern. You mentioned a micro application. Where does that come into play?
Jack:	Oh. **On a quarterly basis we produce and publish an employee telephone listing, sort of a company telephone book**, which consists of the employee's work telephone number and work location. This information resides on a microcomputer that is maintained by **Alice Cockran**, an administrator, who works for Dotty. Because we are such a dynamic and growing company, Alice spends 30 percent of her workweek maintaining the information. Each quarter we produce 5,000 copies of the book and distribute them across the company. Currently this process costs the company $27,000 a year. The sad thing is, the book is probably already out of date the day it is published.
Kira:	What do you mean?
Jack:	We are a large and growing company with sites all over the nation. Every day at least someone is hired or transferred, moves offices, or is terminated. These events all trigger a change to the listing.
Kira:	Before I forget to ask, may I have a copy of your organization chart and who of your organization besides Dotty will be working with me on this project?
Jack:	Good questions. I will have my secretary send you a copy of my organization chart [***the organization chart appears following the interview***]. Like I said before, Dotty Jones will be your direct contact. Her phone is 838-1040 and she sits in office 1016. But, I don't have a problem with you talking to anyone in the HR department if it will help you. By the way my phone number is 838-4456. For now I have a copy of part of a page from our Employee Telephone Listing for you [***the Employee Telephone Listing page appears following the interview***]**.** Dotty will supply you with more forms.
Kira:	Thank you. For this project to be a success we must work as a team and you, the user, certainly must be involved. Now let's talk about the technology you are currently using. Does everyone use a PC?
Jack:	Yes we do. We supposedly have the latest and greatest personal computers that come with the standard word processor, spreadsheet, and database. If you need detailed configuration information, I'm sure Dotty can provide that to you.
Kira:	Do you have electronic mail and do you use the Internet?
Jack:	We are heavy E-mail users.
Kira:	I have just a few more questions so hopefully we won't be much longer. What is your vision of the new system?
Jack:	I envision a system that is easy to use, intuitive, with a graphical user interface. It should be accessible from every desktop in the company (and, as I said, from home using the Internet, provided that it is extremely secure). The interface should be consistent no matter what platform you are using. I have long had the idea that the interface should have a folder metaphor. In other words, if you were an employee entering the system, you would be presented with a series of folders or tabs. Each folder would consist of a certain type of information, such as emergency information, beneficiary information, deductions, and in the future benefits, training, and so on.
Kira:	That's a good vision.
Jack:	And one last thing, which should be held in the utmost confidence. By the end of the year I need to reduce my organization by five administrative positions because of pending overhead reductions. The only way that is remotely feasible is if this system achieves the goal of allowing employees to maintain their own information online. I hope this stresses to you the importance of this project.
Kira:	By all means it does. This has been a very informative and productive meeting. I'm going to review this information and give you my report early next week. Thank you for your time today, Mr. Mills.

ANSWER SHEET: Question 6.1.3

Student name _____

Student number _____

PAYBACK ANALYSIS TABLE

Cash flow description	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**
Development cost:					
Operation & maintenance cost:					
Discount factors for 5%:					
Time-adjusted costs (adjusted to present value):					
Cumulative time-adjusted costs over lifetime:					

Benefits derived from operation of new system:					
Discount factors for 5%:					
Time-adjusted benefits (current of present value):					
Cumulative time-adjusted benefits over lifetime:					
	0	1	2	3	4
Cumulative lifetime time-adjusted costs+benefits:					

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