UNIVERSITY OF COLOMBO, SRI LANKA

UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2013/2014 – 2nd Year Examination – Semester 4

IT4304: Rapid Software Development

Part 2: Structured Question Paper

20th July, 2014

(ONE HOUR)

To be completed by the candidate

BIT Examination Index No: _____

Important Instructions:

- The duration of the paper is **1 (one) hour**.
- The medium of instruction and questions is English.
- This paper has **3 questions** and **9 pages**.
- **Answer all questions.** First and second questions carry 30 marks each and third question carries 40 marks.
- **Write your answers** in English using the space provided **in this question paper**.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the examination hall by a candidate.
- Note that questions appear on both sides of the paper.
  If a page is not printed, please inform the supervisor immediately.

Questions Answered

Indicate by a cross (×), (e.g. [X]) the numbers of the questions answered.

To be completed by the candidate by marking a cross (×).	**1**	**2**	**3**	
To be completed by the examiners:				

(1) (a) Write down three (03) advantages of using Rapid Software Development (RSD). **(6 Marks)**

ANSWER IN THIS BOX
Fast convergence towards the solution
Lowers the cost of the changes through quick spirals of new requirements
RSD allows quick visibility of results to the stakeholders
Usage of reusable Components to decrease the cycle time
Encourages customer feedback through JAD meetings
Business owners actively participates in prototyping, writing test cases and performing unit testing
(Any three of the above)

(b) Give three (03) disadvantages of using Rapid Application Development (RAD) in Software development. **(6 Marks)**

ANSWER IN THIS BOX
Requires highly skilled developers/designers
RAD may not be useful for large, unique or highly complex projects
Need both customer and developer commitments to complete a project
There is no up-front "detailed design", which could result in more redesign effort in the long run.
RAD model can be used only if the system can be modularized.
RAD model has a risk of never achieving the project closure since users might specify enhancements endlessly by looking at the prototypes.
(Any three of the above)

(c) One of the four dimensions of development speed is considered as "People". Briefly explain how "People" impact on the development speed. **(6 Marks)**

ANSWER IN THIS BOX
Any organization may need to change the way it manages its people in order to
improve the skills of the work force, satisfied employees retain corporate knowledge
and develop enthusiastic people to improve the productivity.
Teams can be formed in order to create and maintain competitive organizations.

(d) Give two (02) functionalities of a Content Management System (CMS) which is used in web applications development. **(5 Marks)**

ANSWER IN THIS BOX
CMS provides the necessary arrangement for multiple persons to effectively
contribute content.
It stores and organizes the files and provides version-controlled access to their data
It allows a user, even with limited expertise, to add, modify and remove content from
a Web site without the intervention of a Webmaster.
It provides tools to facilitate communication with the customers.
It gives the ability to reuse content across multiple documents without duplicating it
and to have immediate access to reused content.
It can manage the users by providing specifications about what users can edit, what
pages and what sections of the web site
It streamlines the workflow by using frameworks.
(Any two of the above)

(e) i. Write down two (02) advantages of using "Iterative and Incremental Model". **(4 Marks)**

ANSWER IN THIS BOX
A functioning product is available at the end of every iteration
Able to track the defects in early stages
Able to satisfy the customer by implementing most of the requirements that they want
Less costly to change scope and requirements because of detecting the defects in early
stages
Product requirements may be changed to optimize future iterations
(Any two of the above)

ii. What is meant by a particular "Iteration" of a project which is implemented by using "Iterative and Incremental Model"? **(3 Marks)**

ANSWER IN THIS BOX
A stable, tested, partially completed system.

(2) (a) Name the three (03) size estimation approaches of a software project. **(3 Marks)**

ANSWER IN THIS BOX
Use an algorithmic approach.
Use prior knowledge on similar kind of projects.
Usage of size estimation software.

(b) What is meant by "Function Point Estimation" in the context of Rapid Application Development? **(2 Marks)**

ANSWER IN THIS BOX
Algorithmic way to estimate the size of a project or
Functional type metrics which are suitable for quantifying a software application or
A unit of measurement to express the amount of business functionality of an information
system

(c) If a particular project is scheduled to be completed in 18 months, how many members should work on that project? Show all the steps of the calculation. **(6 Marks)**

ANSWER IN THIS BOX
Months=3*(man-month)1/3
18= 3* (x) x=6
man-months=6^3=216
Members=man-month/months members= 216/18 =12

(d) Write down the following details in connection with a "SWAT Team" in the context of software development teams.

i) Definition ii) Attributes of the team iii) Best fitted applications for this team **(6 Marks)**

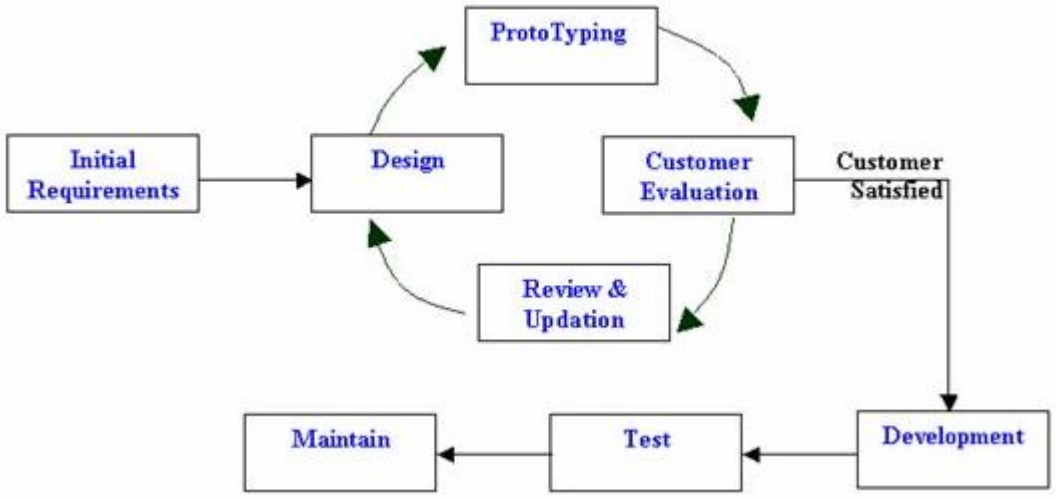
ANSWER IN THIS BOX
i. "Skilled with advanced tools "
ii. Take a group of highly skilled people with in any particular tool to solve the problem.
iii. Appropriate for tactical execution projects

(e) Give three (03) disadvantages of using Prototyping. **(3 Marks)**

ANSWER IN THIS BOX
Sometimes the start-up cost of building the development team, focused on making
prototype, is high.
Once we get proper requirements from a client after showing the prototype model,
it may be of no use. That is why, sometimes, we refer to the prototype as
"Throw-away" prototype.
Too much involvement of the client is not always preferred by the developer.
Too many changes can disturb the rhythm of the development team.
It is difficult to deliver a large number of prototypes during the life cycle for a particular
Product.
(Any three of the above)

(f) Draw a diagram to illustrate the Software Prototyping Model. **(10 Marks)**

ANSWER IN THIS BOX



(3) (a) The table below lists seven main characteristics of "Agile Software Development". Briefly explain (explain in two (2) lines) **five (05)** of them. **(2x5=10 Marks)**

Characteristic	Explanation
Modularity	Modularity allows a process to be broken down into activities.
	A big process/activity is broken in to manageable tasks and sub tasks.
Iterative	Agile software processes focus on short cycles.
	Within each cycle, a certain set of activities is completed.
	The short cycle is repeated many times to refine the deliverables.
Time-Bound	All iterations are set to time limits, ie: any iteration is having a pre-defined start time and end time.
	If the iteration cannot be completed within the allocated time period, functionality may be reduced or activities may be rescheduled.
Parsimony	Requiring a minimal number of activities necessary to mitigate risks and achieve their goals
	This allows software developers to deliver systems against an aggressive schedule, while maintaining some semblance of a normal life
Adaptive	If the goal cannot be achieved using the planned activities during the iteration, new activities can be added.
Convergent	Doing everything within the power to ensure success in the most rapid fashion.
Collaborative	Agile processes encourage communication among team members.
	When a system is developed in a incremental manner, collaborations are requested to understand how to integrate them.

(b) Your company is the software development branch of a leading software service provider (provides services such as installation and maintenance of software and hardware) in the country.

Your company made a bid and won a project to create a "learning management software" (such as Moodle, but with additional features which support distance learning) for an institute which conducts courses and examinations for accountancy and management related subjects. The full software needs to be delivered in 8 months, but, your client wants to have a usable system (with fewer features) so that he can use it for training their lecturers and students. Being new for the software development, your company is not having a well-established software development methodology.
Your company is having following human resources.

Senior Management ……3
Project Manager ……1
Business Analysts ……...3
Technical Writers ……1
UI Designers/Engineers ..……..3
Software Engineers …….4
Integration and deployment engineers …4

The Senior Management of the company wants you to suggest a suitable software development methodology for this project.

i. Discuss the applicability of the following software development methodologies for this project. Which one of the following software development methodologies would you recommend?
Waterfall model, Waterfall model with back tracking and Iterative and Incremental model **(3 x 3 = 9 marks)**

ANSWER IN THIS BOX

WATERFALL MODEL: Waterfall Model is a traditional software development methodology. The Requirement Analysis, Design, Implementation, Testing and Deploying phases are processed one after the other in order. Revisiting a phase is not allowed. It is good when all the requirements are known at the beginning of the project. When new requirements are discovered at the middle, waterfall model is not suitable at all. In waterfall model, the output is produced at the end, therefore, it is not possible to deliver a system with fewer features at the middle of the process. Therefore, waterfall model is not suitable.

WATERFALL MODEL WITH BACK TRACKING: This allows going back to the previous phase if some of the requirements are missed. In the design phase, if it is found that analysis is insufficient, then it is possible to revisit the analysis phase. It is imilar to the implementation phase as well, but, in this model as well, the output is produced at the end. Therefore, it is not possible to deliver a system with fewer features at the middle of the process. Therefore, waterfall model with back tracking is not suitable.

ITERATIVE AND INCREMENTAL MODEL: This is an agile model which allows building a system with multiple iterations (reason for calling it iterative). At the end of each iteration, a part of the system is built (reason for calling it incremental). An iteration is a few (6) weeks long. This allows multiple deliveries to the client at the end of iteration. The feedback received from the client when the client is using the system is used in refining the system in the next iteration. This is the best suitable method for the purpose.

ii. Since the project duration is decided as eight (08) months and you need to provide a usable software in four (04) months, draw how you plan (to analyse, design, implement and deliver) the phases of the project over time. **(5 Marks)**

ANSWER IN THIS BOX

Follow the iterative and incremental development model.
4 weeks (or 6 weeks) long iterations need to be followed.
In each iteration, analyse, design and implement the feature (or set of related features) that is going to be delivered to the client.
The order of delivery of features needs to be discussed and agreed upon with client.
If the client wants a new feature, plan it for the next iteration.
From the feedback received from the client, plan and proceed with the later iterations to build and complete the system.

iii. After further discussions between the development team members, the project manager and the senior management, everybody is agreed to use scrum as the software development methodology.
List five (05) advantages of scrum methodology. **(6 Marks)**

ANSWER IN THIS BOX

Scrum is an agile process model that focuses on a set of project management values and practices to deliver the highest business value in rapidly changing environments.

Scrum emphasizes on practical rather than defined processes.

It is easily combined with other methods.

Scrum team is a self-directed and self-organizing team .

Scrum allows no external addition of work to an iteration, once chosen.

Scrum advices daily stand-up meetings with special questions.

Scrum advices demonstration to external stakeholders at the end of each iteration.

In each scrum iteration, client-driven adaptive planning is done.

(Any five of the above)

iv. What are meant by the terms ‘Sprint’ and ‘Sprint Backlog’ in scrum? **(5 marks)**

ANSWER IN THIS BOX

Sprint: Work is organized in 30 day calendar iterations. Each iteration is called as ‘Sprint’.

Sprint backlog: Sprint Backlog contains the list of tasks that are required to completed during the sprint in order to achieve a set of requirements defined in the Product Backlog.

v. It is given that the sprint duration is one (01) month (30 days approx.)

List five (05) – seven (07) tasks that you would think as appropriate for the 4th sprint of the project.

Then, draw the sprint backlog for the start of the 4th sprint, including at least three of the mandatory columns (other than task list).

In the sprint backlog, include the above listed tasks. **(5 marks)**

ANSWER IN THIS BOX

A chart like below is expected.

Tasks List:

Meet to discuss the most essential features.

Analyze the most essential features identified above.

Negotiate with the client for the features delivered in this iteration and next iteration.

Design the features

Implement the features

Test the functionality of newly added features

Test the functionality of overall system

Deliver to the client

	A	B	C	D	E	F	G	H	I
1	Sprint Backlog								
2	Task Description	Originator	Responsible	Status	Hours of work remaining				
3					6	7	8	9	10
4					362	322	317	317	306
5	Meet to discuss the goals and	JM	JM/SR	Completed	20	10	0	0	0
6	Move Calculations out of	TL	AW	Not Started	8	8	8	8	8
7	Get GEK Data		TN	Completed	12	0	0	0	0
8	Analyse GEK Data - Title		GP	In Progress	24	20	30	25	20
9	Analyse GEK Data - Parcel		TK	Completed	12	12	12	12	12
10	Define & build Database		BR/DS	In Progress	80	80	75	60	52

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