



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN SOFTWARE ENGINEERING
SSE 314 SOFTWARE DESIGN AND ARCHITECTURE

DATE: Tuesday 17th April, 2012

TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS

- (i) This paper contains **FIVE** questions.
 - (ii) Answer question **1** and any other **TWO** questions
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Question 1 (COMPULSORY)

- a)
 - i) Explain three reasons why software maintenance is inevitable (3 marks)
 - ii) Discuss the major causes of software maintenance problems (2 marks)
- b) State and explain any three types of module cohesion (6 marks)
- c) What is the difference between software architecture and top-level design (2 marks)
- d) A good design is one that balances trade-offs to minimize the total cost of the system over its entire lifetime." These criteria include coupling, cohesion, and connascence.

- i) Give four ways by which you can achieve loose coupling (4 marks)
- ii) State three advantages of reducing connectivity (coupling) (6 marks)
- e) What is the 'intent' of an adapter design pattern? (2 marks)
- f) Give THREE areas where you can apply the adapter pattern (5 marks)

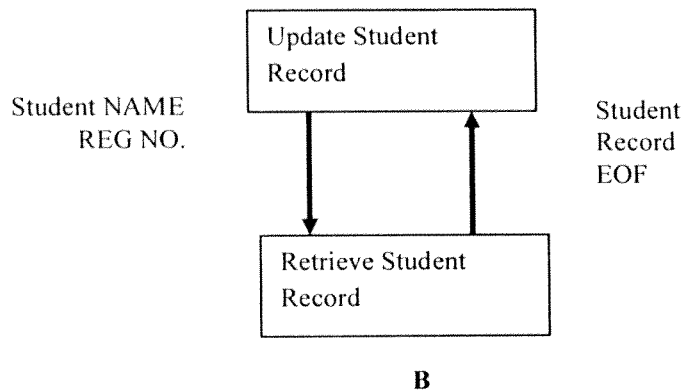
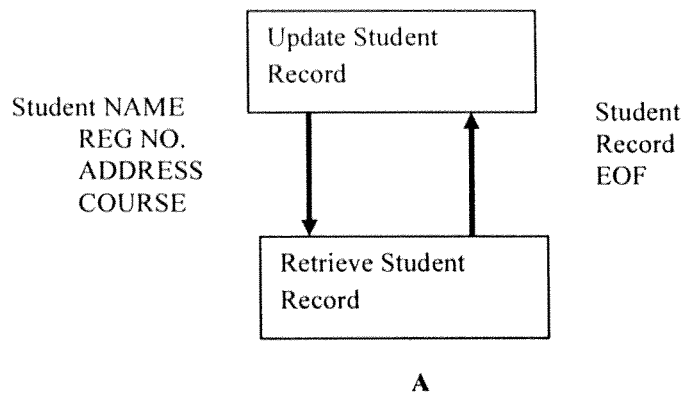
Question 2:

Design patterns can broadly be classified into three categories, creational, structural and behavioural patterns

- a) Briefly explain what you understand by creational patterns (3 mark)
- b) Differentiate between class creational patterns and object creational patterns? (4 marks)
- c) Explain any two examples of creational patterns (6 marks)
- d) State any three benefits of using design patterns (3 marks)
- e) Give any four reasons for reverse engineering (4 marks)

Question 3:

- a) Define the following terms *re-engineering*, *reverse engineering* and *forward engineering* (4 marks)
- b) Explain the software re-engineering process model (4 marks)
- c) List any three factors that affect re-engineering cost (6 marks)
- d) You are provided with two diagrams A and B that show examples of coupling when updating a student record in a student information system.



- i) Identify the degree of coupling in A and B (2 marks)
- ii) Between A and B, which one would be considered as a good design? (2 marks)
- iii) Give reason for your answer in ii) above (2 marks)

Question 4:

- a) Differentiate between software design and software design description (2 marks)
- b) Briefly explain the software design process (3 marks)
- c) Describe a good design in relation to module coupling and module cohesion (5 marks)
- d) Explain any two principles of software design (4 marks)

e) In software design concept, what do you understand by the following terms

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| i) Abstraction | (2 marks) |
| ii) Refinement | (2 marks) |
| iii) Modularity | (2 marks) |

Question 5:

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| a) What do you understand by formal technical reviews(FTRs) | (1 mark) |
| b) List any THREE objectives of FTRs | (3 marks) |
| c) Explain any THREE challenges that are faced designers of future
middleware systems | (6 marks) |
| d) What are some of the benefits that can be realized when a middleware
architecture is used | (4 marks) |
| e) Explain any four attributes of an effective software metric | (6 marks) |

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