University Examinations (2012/2013)

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

ICS 2302: SOFTWARE ENGINEERING

AUGUST 2012   TIME: 2 HOURS

INSTRUCTIONS: ATTEMPT QUESTION ONE AND ANY OTHER TWO QUESTIONS.

QUESTION ONE   [30 Marks]

a) Define the following terminologies as used in systems development: (8 marks)
  i) Software engineering:
  ii) Software:
  iii) Software process:
  iv) CASE:

b) Define the term Software Process Model and outline its three process perspectives: (3 marks)

c) Differentiate between computer science and software engineering: (2 marks)

d) Describe the following process models in detail (giving the drawbacks of each, and application areas where applicable):
  i) Waterfall model: (3 marks)
  ii) Evolutionary development (elaborate on the two types of the evolutionary development models):
  iii) Formal transformation model: (3 marks)
  iv) Integration from re-usable components model: (1 mark)

e) System development involves wider responsibilities other than the application of technical knowledge. State the professional and ethical responsibilities of a system developer.

                                                           (5 marks)

QUESTION TWO   [20 Marks]

a) Define the term process iteration   (2 marks)

b) There are two approaches to process iteration:
  i) Incremental development
  ii) Spiral development

Differentiate between the two approaches.   (4 marks)

c) State the merits of the incremental development.   (8 marks)

d) Define the term software specifications.   (2 marks)

e) The requirements engineering process can be divided into stages. Outline the stages of requirements engineering. (4 marks)

QUESTION THREE [20 Marks]

a) Define the following terms as used in software development: (6 marks)
   - i) Software design
   - ii) Software implementation
   - iii) Programming
   - iv) Debugging
   - v) Software validation
   - vi) System testing

b) State the purpose of each of the following testing processes: (5 marks)
   - i) Unit testing
   - ii) Module testing
   - iii) Sub-system testing
   - iv) System testing
   - v) Acceptance testing

c) Define the term automated process support (CASE tools) as used in system development
   (2 marks)

d) State the functionality of the following CASE tools:
   - i) Graphical editors
   - ii) Data dictionary
   - iii) Graphical user interface
   - iv) Automated translators (4 marks)

e) CASE classification helps to understand the different types of tools and their support for process activities. Several perspectives can be used to classify CASE tools. Differentiate between the following perspectives: (3 marks)
   - i) Functional perspective
   - ii) Process perspectives
   - iii) Integration perspectives

QUESTION FOUR [20 Marks]

a) Differentiate the following terms as used in system development: (2 marks)
   - i) Software requirements
   - ii) Requirements engineering

b) Describe the following types of requirements: (7 marks)
   - i) user requirements
   - ii) system requirements
   - iii) functional requirements
   - iv) Non-functional requirements
   - v) Domain requirements
   - vi) Organizational requirements
   - vii) external requirements

c) highlight and explain the challenges facing requirements engineering: (6marks)

d) highlight the guidelines for writing requirements: (5 marks)

QUESTION FIVE   [20 Marks]

a) User interface design must take into account the needs, experience, and capabilities of
   system users. Explain the following user interface design principles: (6 marks)
   - i)   user familiarity
   - ii) Consistency
   - iii) minimal surprise
   - iv) recoverability
   - v)   user guidance
   - vi) User diversity

b) State the characteristics of a graphical user interface(GUI)   (5 marks)
c) State the advantages of using a graphical user interface (GUI)   (4 marks)
e) User interaction and information presentation can be integrated through s coherent
   framework such as a user interface metaphor. Describe the following interaction styles:
                                                                           (5marks)

   - i)   Direct manipulation
   - ii) Menu selection
   - iii) Command line language
   - iv) Natural language
   - v)   Form fill