

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Semester 1 Examinations 2012/13

Module Title: Engineering Web Applications

Module Code: SOFT8002

School: School of Computing and Mathematics

Programme Title: Bachelor of Science (Honours) in Web Development – Stage 3

Programme Code: KWEBD_8_Y3

External Examiner(s): Mr. Joseph Lynam

Internal Examiner(s): Mr. John O'Brien

Instructions: Answer 4 questions.

Duration: 2 Hours

Sitting: Winter 2012

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

- Q1.** (a) (i) What is Web Engineering, (WebE)? [2 Marks]
(ii) What does the term WebApp refer to? [2 Marks]
(iii) Consider the following WebApp characteristics:
 - Network intensive;
 - Unpredictable load.
List three other WebApp characteristics. [3 Marks]
- (b) (i) In the context of WebE, why is an agile approach to development recommended? [4 Marks]
(ii) Agile WebE combines a philosophy and a set of development guidelines. What does the agile philosophy encourage? [6 Marks]
- (c) Elaborate, briefly, on each of the following WebE best practices:
(i) Describe how users will interact with the WebApp using a scenario-based approach.
(ii) Always develop a project plan, even if it is very brief.
(iii) Spend some time modelling what it is that you are going to build.
(iv) Review the models for consistency and quality. [8 Marks]
- Q2** (a) Consider the following fundamental principle of software engineering that is also applicable to the activity of WebE:
“Understand the problem before you begin to solve it, and be sure that the solution you conceive is one that people really want.”
The *communication activity* is, thus, a critical factor in the undertaking of any problem-solving, including WebApps development.
Describe the WebE communication-activity; use the following headings to structure your presentation:
 - i. Formulation. [3 Marks]
 - ii. Elicitation. [4 Marks]
 - iii. Negotiation. [3 Marks]
- (b) Consider the following assertion:
“Planning is a key activity on a WebE project.”
Do you agree with the above-listed assertion? Justify your answer. [5 Marks]

- (c) Consider the following project specification with estimated activity-durations and precedence requirements:

<i>Activity</i>	<i>Duration(days)</i>	<i>Precedents</i>
A	6	None
B	4	A
C	3	A, B
D	5	B
E	2	C
F	10	None
G	5	C,E, F
H	4	C, D

1. Develop a network representation, using *activity-on-a-node* notation, to reflect the above-listed project details. **[3 Marks]**
2. Analyse your network by carrying out a *forward pass*, to calculate the earliest dates at which activities may commence and the project may be completed; record these on your network diagram. **[3 Marks]**
3. Analyse your network by carrying out a *backward pass*, to calculate the latest start and finish dates for your project's activities; record these on your network diagram. List your project's critical path tasks. **[4 marks]**

- Q3. (a)** A Webapp-content model is a representation that provides a clear indication of the content that is required to support a usage scenario. The content model includes all analysis classes. Describe, in detail, content model analysis-classes. Use the following headings to structure your presentation:
- i. Manifestation. **[2 Marks]**
 - ii. Attributes. **[2 Marks]**
 - iii. Operations. **[2 Marks]**
 - iv. Collaborations. **[2 Marks]**
- (b)** The vast majority of WebApps enable a “conversation” between an end-user and application functionality, content, and behaviour. Such a conversation can be described using an “interaction model” that can be composed of one/more of the following elements:
- i. Use cases. **[5 Marks]**
 - ii. Sequence diagrams. **[4 Marks]**
 - iii. State diagrams. **[4 Marks]**
 - iv. User interface prototypes. **[4 Marks]**

Describe the use of each of the above-listed interaction model components. Support your presentation with suitable illustrative examples.

- Q4. (a)** Elaborate on each of the following WebApp quality attributes:
- i. Security.
 - ii. Availability.
 - iii. Scalability
 - iv. Time-to-market. **[8 Marks]**
- (b)** Discuss, briefly, each of the following design goals, suggested by **Jean Kaiser, 2002**, that are applicable to most WebApps, regardless of application domain, size, or complexity:
- i. Simplicity. **[3 Marks]**
 - ii. Consistency. **[3 Marks]**
 - iii. Robustness **[2 Marks]**
- (c)** Discuss, in detail, the issue of Architectural design for WebApps. Your presentation should refer to:
- i. Content architecture. **[5 Marks]**
 - ii. Web architecture. **[4 Marks]**
- Q5. (a)** Summarise the testing strategy that is recommended for use on WebE projects. **[8 Marks]**
- (b)** Database testing for WebApps is complicated by a variety of issues. Identify, and elaborate on, **four** factors that complicate WebApp database testing. **[8 Marks]**
- (c)** Usability testing attempts to evaluate the degree to which users can interact effectively with the WebApp and the degree to which the WebApp guides users' actions, provides meaningful feedback, and enforces a consistent interaction approach.
- i. Identify, and elaborate briefly on, **four** characteristics that are the focus of usability testing. **[4 Marks]**
 - ii. What is the recommended sequence of steps for usability testing? **[5 Marks]**

End of Exam!