Part 1: Statistical Information

Table 1: Distribution of grades awarded in May 2009

<table>
<thead>
<tr>
<th>GRADE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>Abs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>20</td>
<td>37</td>
<td>69</td>
<td>37</td>
<td>23</td>
<td>34</td>
<td>6</td>
<td>226</td>
</tr>
<tr>
<td>% of Total</td>
<td>8.85</td>
<td>16.37</td>
<td>30.53</td>
<td>16.37</td>
<td>10.18</td>
<td>15.04</td>
<td>2.65</td>
<td>100</td>
</tr>
</tbody>
</table>

Part 2: Comments regarding candidates’ performance

Comments regarding Paper 1

Question 1
This off-the-book question specifically required one answer, namely, ‘Full Adder’ was answered correctly by 70% of the candidates, while the rest had no clue or made mistakes in the truth table showing problems in that area.

Question 2
This question had a good combination of truth tables and Karnaugh maps which around 50% of the students had no problem, while approximately 30% who had mistakes and a final 20% who got the answer completely wrong.

Question 3
A straightforward question that tests the candidates’ knowledge about computer architecture turned to be quite a challenge. Half the students got it right while the rest failed to give a full answer or no answer at all.

Question 4
This was quite a focused question about the Complex Instruction Set Computer, which only 40% of the candidates tackled well. Another 30% tried to improvise on the meaning of the acronym with some very curious replies, while the rest did not attempt the question.

Question 5
The vast majority of the students gave correct answers names three types of OS. A few incorrectly listed Windows, Linux and MC and different types of OS.

Question 6
Generally, this question was answered well. Almost everyone knew about the basic responsibilities of an OS.

Question 7
3/4 of the students knew the answer to this question but the majority mixed up part (v) i.e. cross-assembler.

Question 8
Most students were capable of giving examples of the different types of instructions.

Question 9
Most students understood the program but found it hard to execute it. In fact a substantial majority of them got it wrong.

**Question 10**

a) Many students have a notion of what polymorphism is, however some mentioned overloading as part of the polymorphism mechanism. This mechanism is however mainly achieved through method overriding. Ideally the idea of late binding should have been mentioned in relation to method overriding. Some students did not provide an example to sustain their arguments.

b) One advantage when designing software is the way in which polymorphism is used to overcome the limitation (in Java) of single inheritance. Use an interface and have classes implement this interface. Majority of students did not mention this idea, but just mentioned code reuse.

**Question 11**

Most students explained what a 3rd generation language is, making references also to the other generations. However, very few explained what being a strongly typed language means.

**Question 12**

75% of the students gave a correct answer to this practical question showing a good understanding of the initial steps of software development. The rest of the candidates gave an incomplete answer but very few failed not to answer.

**Question 13**

Saying that Modularity is a method that uses modules is not enough to answer this question, which is what the majority of students attempted to do. Simply saying that this technique is an effective programming skill that splits up the bulkiness of the program into smaller parts thereby achieving chunks of code that perform specific independent tasks without interfering with one another would have been enough. Approximately 40% of the students got full marks on this question while the rest partially replied, gave a recursive answer, or declined completely.

**Question 14**

Practically all gave correct answers with varying amounts of detail when describing the role of the assembler.

**Question 15**

Most candidates gave examples to demonstrate the difference between terminal and non-terminal symbols. Some indicated the symbol using in the BNF notation as being the terminal ones which is incorrect.

**Question 16**

Around 95% of the students got this one wrong. Only a few were able to correctly describe what a JIT compiler is and thus naming one advantage.

**Question 17**

Most students knew what is the Internet and the WWW but few could really distinguish between them. Almost all students had no idea what is Web 2.0

**Question 18**

Almost all students knew the layers of the OSI ISO model.

**Question 19**

Almost all students knew the different network topologies.
Question 20
(a) Most of the students explained what a Hash table is, even providing an example to sustain their answer. Some however, did not clearly highlight the mapping process between keys and hash values, based on a hashing function.
(b) Most students explained fairly well what the term collision means and some mentioned more than one collision detection technique.

Comments regarding Paper 2

Question 1
80% of the candidates who attempted this question earned full marks except for those candidates who had no realistic and justified recommendation. The question requested common sense from the candidates to test their opinion if they had been faced by the situation in reality. There was no one correct answer to this question but as long as the candidates’ reply was rational and duly justified they would have earned the allocated marks.

Question 2
(a) In general most of the students knew what process control was and managed to give good explanations.
(b) Again most of the students gave correct answers and named the three different states a process can be in after it is started.
(c) In general students demonstrated their awareness of what causes deadlock. However, in a number of cases, the example given to explain how deadlock occurs was not entirely correct.
(d) Most of the students gave reasonably correct answer by describing how mechanisms like mutual exclusion, pre-emption, etc can be used.
(e) Only around half of the students provided convincing answers. Some of the rest indicated restarting the PC as one deadlock recovery mechanism available to the OS.
(f) Nearly 100% of the students got this one correct.

Question 3
(a) Most students attempted this question. The rational behind it was to understand whether the students can understand a program. Although most students got it partially correct and got most of the marks, very few obtained full marks. The program was meant to represent a sequence (since there is a loop involved), few students realised that and actually mentioned it in their answer. Most of them just made a dry run of the code which was not enough to obtain all the marks.
(b) Most of the students managed to execute the program correctly. Only few got mixed up.
(c) This execution was based on the workings in b and in fact most of the students got it correct as well.

Question 4
(a) (i) Most students knew what is a hacker and a virus but few could distinguish the difference between a worm and a virus.
(ii) Most students answered this question correction and provided adequate protection strategies and tools.
(iii) Few students clearly understood what privacy threads are. In fact, some of the students mixed them with other threats such as secrecy, copyright infringements, etc.
(iv) This question was a simple one but very few students answered correctly.
(b) (i) Most students had no idea what e-Gov was. They realised it has something to do with the government. In fact some of them managed to get the benefits correct but it was obvious from their examples that they were unsure about the topic.
(ii) Most students had no idea what e-Gov was. They realised it has something to do with the government. In fact some of them managed to get the drawbacks correct but it was obvious from their examples that they were unsure about the topic.
(iii) Students gave very similar examples and some of them were essentially the same things. So even though most answers were correct, their quality was not so good.

Question 5
(a) Many students just provided a definition for the acronym: DBMS. A more complete definition was required.
(b) Many students elaborated effectively on the structure and functionality of a DBMS. Others however limited themselves to only certain aspects, such as data dictionary and querying, while not making any references to others such as security.
(c) (i) Some students did not use the correct notation as defined in the syllabus, but where most probably biased by that used in specific applications, such as MS Access.
   (ii) Students had to come up with a primary key for the “ItemTaken” table but very few actually did. The other attributes where in general correctly chosen from the supplied list.
   (iii) Most students defined (using the requested format) correctly the majority of the tables, except for the “ItemTaken” table.

Question 6
(a) (i) Majority of students knew the difference between public and private and explained this correctly.
   (ii) Most students correctly indicated and elaborated on the concept of encapsulation.
   (iii) Majority of students correctly mentioned protected as another access modifier.
(b) (i) & (ii) Many students understood these questions. However some failed to either make use of the requested modifiers or else did not correctly design the class (placing common methods/variables in super, so that these are inherited by the sub-classes).
   (ii) Some students made use of the wrong notation or limited themselves to drawing the class diagram but did not provide the required details: e.g. no references to access modifiers.

Question 7
Very few candidates chose to answer this question and only 25% of them got the full marks where all that was required was to give the classical software development stages, namely Domain Research, Analysis, Specification, Design, Implementation, Testing, Deployment and Maintenance; together with the basic components, namely GUI, Database, Backend application with basic intelligence. 75% gave a wrong answer or partially replied to the question.

Question 8
(a) In general well answered by stating that a natural language is ambiguous whereas a formal language is not.
(b) Generally well answered, i.e. using BNF.
(c) The vast majority of the students managed to correctly distinguish between the syntax and semantics of a formal language.
(d) Only a few managed to describe all the stages of compilation with most of the candidates only describing the analysis or (front-end) component of a compiler. Also, a considerable number of candidates were not able to provide adequate exemplification when describing the process.
(e) Only a few of the candidates were able to answer this one correctly, namely than the same syntax can generate more than one parse tree.
(f) Most candidates were able to correctly describe what a cross-compiler is.

Chairperson
Board of Examiners
July 2009