As per 2011, candidates completed the exam paper on computer.

There were still many candidates who could improve their answers by using better formatting techniques such as paragraphing, dot points and correct punctuation. Some candidates also only used short answers and were perhaps were unaware they could type more than they did in the space provided.

In general, answers tended to be better answered at the start of each section (rather than at the end) and the markers felt a proportion of candidates ran out of time, resulting in poorer responses for the later questions in each section.

Some candidates also misjudged the timing the entire exam and returned good scores for the first section (appearing that they spent more time on this section) and not so good marks for the second.

It was noted by the markers that some candidates only answered part of the question (ie if the question asked for 2 responses they may have only given one).

Candidates, who scored better marks, answered all parts of the question/section and did not ‘waffle’ in their responses.

At the higher end of the scale, critical analysis; specific examples; citing legislation and providing alternative solutions were used by candidates to ensure the higher grades.

SECTION A

The most popular questions with about 60 out 82 candidates answering this section.

Overall it was answered quite well however where candidates fell short was ensuring that they adequately answered each part of the question and understood what was being asked.

Question 1

(a) This question was generally answered well with most candidates identifying the problems and merits. Some candidates failed to realise the option of an automatic answer was possible when using a telephone system.

(b) Many did not answer this question in the context of an ICT problem and many did not see both the advantages and disadvantages that were possible with the solution.

(c) Most candidates came up with the concept of using a smart phone App and or a website solution.
(d) Most candidates realised that the second option was the most realistic for Metro to explore unless they answered part c with an innovative idea.

Sample Answers

(a) using the phone – old-fashioned
   requires human interaction
   may take time clarifying which bus route is required
   metro phones may be busy so a delay
   is the time of the next bus accurate or just the published time?
   however discussion with the operator may be helpful to some people who need to clarify the route or place they need to visit

(b) what size would the displays be?
   showing relevant times
   how suitable are the displays for power poles or similar, e.g. exposure to weather, vandalism, readability
   is the next arrival time accurate or just the scheduled arrival time?
   how would display communicate with the buses and Metro base depot - by Wi-Fi or 3G/4G?
   how useful is it to just show the time of the next bus?

(c) Some possible ideas:
   • a smart phone app which will allow passengers to interact with Metro - is accurate data?
   • a scrolling display at each bus stop showing perhaps the next two or three buses
   • rather than a visual display could press a button to get audible times and routes for next two or three buses (would help vision-impaired people)

(d) The small display at the bus stop would be good, may be better if would show more than one time.

   Major challenges would be making them robust (ie. re vandalism) and reliable in communication with the Metro base depot and buses. An advantage is that it gives each bus direct contact with the Metro base so Metro know at all times exactly where each bus is and can monitor against their schedule.

Question 2

(a) Some candidates failed to understand the meaning of scope and boundaries.

(b) Generally answered well but even then there were some way out there answers including suggesting an expert system.
Sample Answers

(a) The scope and boundaries refer to what is within the new system to be developed and therefore what is not to be considered.

The scope could include ideas like arrival time of each bus at each bus stop needs to be recorded, and/or exact position of each bus known (e.g. GPS).

Each bus is required to communicate with the Metro base depot and back to each bus stop.

A suitable visual display is to indicate expected arrival time of at least the next bus.

The boundaries in this case might consider that it is not tracking individual passengers, no suggestion that a smart phone app is required.

(b) Suitable information system here could be database based or spreadsheet based.

A Database Solution:

Each individual route e.g. from a suburban start point to the city terminals, can be considered a record in a database file. That means the fields would include dates, route number, start time, expected arrival time, Stop1 expected arrival time, Stop1 actual arrival time, continuing through to the lastStop actual arrival time to the terminus. It would be easy to add passenger numbers as collected (dynamic) if wished.

Link to this using calculated value fields as the bus arrives at each stop - its actual arrival time can be compared with the calculated arrival time. Useful tool - Metro is able to query and report on all arrival time data. Each display at a bus stop would then be querying database, where each bus stop had been previously identified as having relevant bus arrival times (e.g. three bus routes may join at a particular point).

A Spreadsheet Solution:

This would be a very similar idea where the spreadsheet is organised in rows and columns - each row shows one bus route at one time, and each column would show the expected or actual arrival time at each bus stop. Using the spreadsheet functions again expected arrival times for later bus stops would be calculated.

Because all this data collected is to do with times and dates the database solution might seem the better option.

Expectations:

- Metro owns or purchases a robust online database and hardware to operate it
- Each bus arrival time accurately and reliably recorded on at each stop, and bus communicated with
The database will reliably output e.g. the next three (in chronological order) arrival times

(it is not likely any other information system other than a purpose-built system would provide better functionality than these, e.g. a webpage).

Question 3

(a) Many candidates realised that a GPS system was a convenient means of gathering position data for buses and transmitting back to Metro.

Often mentioned though was the concept of bus drivers reporting their position regularly to Metro central– which on the face of it seems an option but in the view of the examiners quite unrealistic.

(b) Almost all candidates considered (almost to the exclusion of other vital aspects of the display) the inevitable vandalism issues. A few candidates misread this question and thought a paper display was being suggested. The cost of providing and placing a display, including power supply, communication requirements at each bus stop was mentioned by many candidates.

(c) Most candidates mentioned mobile phone network and at least one mentioned the NBN.

Sample Answers

(a) If the data is to be collected from each bus either can be collected as it arrives at each bus stop, as it departs each bus stop, or regularly as the bus is moving (e.g. GPS).

If each bus had a transponder which communicated with a fixed receiver at each bus stop when the buses within say 5 m of the receiver, then Metro can monitor arrival and departure times at each stop. This assumes either the bus stops at each bus stop or travels sufficiently close to the receiver to be detected as it goes past.

If the communications system to each bus stop is either hardwired or uses perhaps the mobile phone network then the data will be constantly forwarded to the Metro base depot and can be saved in the database or similar.

(b) The displays need to be suitable size for clarity and detail (visual or with audible indication)

Considering robustness of displays on smart phones, iPads etc. - quite robust, vandal proof displays seem possible.

The displays would need to work in the full range of brightness from night through to full sun, with or without colour.
How securely can they be mounted so that can't be stolen, e.g. behind safety glass
If each bus stop has this communication facility they may be able to provide extra Wi-Fi functionality and for those who wish extra information display technologies might include LCD, OLED or similar.

(c) As mentioned above this would include the mobile phone network, or hardwired e.g., optical fibre cable as part of the NBN, or a simpler connection to the nearest power pole and a dedicated line back to Metro.

Question 4

(a) Many candidates correctly identified possible damage to the brand and reputation of Metro and possible loss of revenue. Others mentioned passengers could miss appointments/school if they relied on the incorrect information.

(b) Candidates generally recognised that this was contrary to the Commonwealth Copyright Act but failed to explain that Metro would (by commissioning the system) would most likely own the copyright unless the author reserved that right. Other criminal offences may be involved (Fraud) and the employee would face disciplinary actions – including possible dismissal. Many candidates failed to realise that copyright of a computer program was automatic under Australian Law and required no registration although taking a patent out would require registration.

(c) Most candidates recognised that this would be a nuisance to Metro and possible involve a breach of the Cyber Crimes Act or the equivalent State Act.

Sample Answers

(a) If the data is often wrong it would suggest Metro has wasted its money providing this functionality at each bus stop.

If the bus arrival and departure data is correct then calculations of expected arrival times should also be correct.

If passengers expect accurate times for planned visits at particular times they would be frustrated if the times are consistently wrong – other than peak traffic times being considered.

Metro would want to query why their times were not accurate if they believed they were recording correct data.

(b) Metro will have purchased the software or paid for the development of the software so they own the copyright in the system. It would be up to Metro to sell the software not for an employee to copy it, and therefore the employee would be breaking copyright and could be prosecuted.
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For example if the software had cost $50 000 to be developed then Metro may be able to sell a working version for $10 000 to another bus company. Metro does not have to record its copyright (e.g. like patent) except by indicating that it has copyright in the software.

(c) It is certainly a nuisance for Metro because it would be degrading their intended communication system. They would not see it as a public system until they put information on the displays so they may choose to give a warning or they may threaten prosecution. More importantly if a hacker is raising money from the paid-for advertising then perhaps he could be charged with theft of computing resource (State crime)?

If this became a pattern Metro may need to look at encryption or a more secure way of communicating between buses, bus stops and their depot to prevent external access to their displays.

SECTION B

This question was particularly handled well in by the majority of candidates. Twenty-nine candidates attempted this section.

Question 5

(a) Generally handled well, however a small percentage of candidates only redefined the project in clear terms, without explaining HOW they would define the scope of the project. Another small percentage of candidates, went about describing in detail how they would fix the problem. This was not required by the question.

(b) Candidates who did well mentioned the ‘stakeholders’ and then described why these people were important. Some vague answers were suggested by some.

(c) Most candidates were able to describe two effective ways of communicating. There were fewer candidates, however, who compared both methods and then gave a recommendation for the better option.

Sample Answers

(a) You must first clarify what the real issues are there are many people to interview, for example each person in the administration of the club, many of the committee members, especially those who wish to discuss their concerns. Also the 150 members of the tennis club, and it would be sensible to contact at least some of those to fund the extent of the problems.

It could be done by interview or questionnaire, or online.
(b) People in administration have their view of problems but also would have the relevant paperwork and insight to see both what is working and what is not, for example other personal problems, time issue problems, is there a problem with the amount of paperwork required, or have just inherited inefficient processes?

Other people on the committee also would also have opinions and as relative outsiders who are seeing both the administration position and probably talking with members about their concerns.

There may be power struggles within the club, and these might be being highlighted through the problems raised.

The members themselves are the ones to supply information and request information back, so finding out how the average member relates with the club would be very helpful.

(c) One way would be to prepare a word processed document which clarifies the scope, went through maybe a series of issues raised, and types of feedback and made it quite clear about the issues raised and feedback from administration, committee and the members. This would mean that each person would be able to take away a printed copy of the findings, assuming that it was desirable to make such a document public.

Another alternative would be to prepare a PowerPoint (or similar) presentation which may follow the same sequence but would not be intended to be the same sort of published document as a word processed document. This would suit particularly that it was not to be circulated, so that no printed copies are available, although a printout of the PowerPoint slides could certainly be made.

Either of these methods would be considered suitable depending on the preferences of the committee.

Question 6

(a) Most candidates were able to describe three changes that they would like. Often though, this was just a personal opinion and was not justified, eg. ‘I didn’t like the colours’. The better candidates were able to see the bigger picture eg. Improve usability; Promote correct branding etc. and then go on to describe three or more changes which would see this happen.

(b) Generally answered poorly. The question asked to ‘Describe an effective information system’. Most candidates discussed a software solution, but didn’t refer to all parts of an information system (Hardware, software, people, data and procedures). Databases/Spreadsheets were the most popular answer for a software solution.
Sample Answers

(a) The images on the website are fairly small and indistinct and there is no suggestion of animation.

The calendar of events is not presented easily to follow - there could be a more diary-like approach.

The webpages themselves are just plain text with hyperlinks - a more exciting approach e.g. using DTP ideas or more creative presentation, would be helpful.

There don’t appear to be any videos and that certainly would give many alternative possibilities of how information could be presented.

(b) Membership records can be stored in a spreadsheet or database, either would be a suitable way of storing and accessing records. Printouts from the database or from relevant summary spreadsheet information.

Question 7

(a) Answered well, with most choices being justified.

(b) Many candidates talked about what they thought made a good website, and indeed the mention of CMS was talked about often. A small percentage, however, failed to answer the question in full and didn’t address the three recommendations needed – hardware, software and communication. Better answers again looked at the bigger picture and talked about issues such as Web 2.0 and Cloud solutions.

(c) Generally handled well. Many candidates talked about CMS/Dynamic server situation. Better answers described how ease of access (multiple authors) and database driven websites were the best way to go.

Sample Answers

(a) Yes, Excel or any spreadsheet could certainly be used, they would be very easy to set up to manage the club's finances. However because all parts are being set up and mistakes will be made first time it may not work until fully tested, etc.

If the time to set up a spreadsheet is valued it is quite possible that it had would've been cheaper to buy recognised accounting software which may be easily set up to run a sports club with little customisation.

However, people may volunteer their time and experiences to set the spreadsheet and it might be simple to use, may be easily verified and have really only the features that the tennis club needs, not a whole lot of ‘baggage’ features in it.
(b) If the tennis club had to buy new software, hardware and possibly new communication equipment these are some things they might consider:

software - Microsoft Office or OpenOffice including word processor and some graphics tools. They may want specialist image editing software or video editing software depending on who would do the work and what software was available, and their wish to learn.

For hardware may need to upgrade via one or two computers - may have one computer dedicated to only looking after the website.

It is quite likely that they would find a still or video camera helpful and possibly a colour printer e.g. colour laser, which would be used for many other reasons within the club.

Because the website will be uploaded to an ISP they would need nothing more than decent ADSL or broadband communication capabilities.

(Much good shareware or public domain software is available to fill in gaps, if required.)

(c) The website can be as up-to-date as the people who manage it choose to be, eg. can be updated daily, weekly, fortnightly. So the feasibility of keeping website more up-to-date comes down to who would do it, what time they have for it, access to the resources they would need (equipment photos, dates).

The software and hardware required would be as in 7(b) but if they are doing more updating they may choose to buy better software or hardware, or have for example more cameras available so that more people can take photos.

Question 8

(a) Many candidates discussed the notion of getting permission from the members before any information was displayed. Discussion around the privacy principles/website privacy statement/terms and conditions of entry to the club yielded better grades.

(b) This question was handled pretty generically with candidates suggesting that parents had to provide written permission to the club before photos/videos should be displayed on the website. There was little discussion however about images/video being taken in public vs private places, which would have added weight to any answer.

(c) Better answers not only talked about the obvious viruses, firewall and antispam programs, but also talked about security features (passwords etc) built into financial and operating systems. Some candidates extended the notion further and talked about the misuse of sensitive data by employees and what could be done about it.
Sample Answers

(a) When contact details for the members are sought they can be asked to tick (or sign ...) that they are willing for those to on the website for ‘public access’. A person who wishes to limit the contact details would provide alternative ways of being contacted.

Junior members could either provide information or their contact could be via their parents, for example.

(b) Yes there are some legal issues relating to children’s information being put on a website. This can relate to identifiable images of children, specific details such as name, or the possibility that the images may be misused. However newspapers every day publish photos of children in sport and other activities with their names, and provided it is in the public domain and it is understood that this website is publicly accessible general photos would not appear to be a concern. However all children and parents should be given the option to make sure that their children are not identifiable in any specific photo if they choose. That would mean the club should require specific consent before any particular child’s name or photo is published on the website. This would also include taking down one or more flawed photos if there was a complaint about it.

(Laws are more specific about taking photos in change rooms, etc.)

(c) Having the accounting software or the spreadsheet software setup does not guarantee all is perfect re issues of finance and assets. That would mean that all the normal processes of checking for accuracy and reliability and validity would apply including:

Making sure monthly/quarterly/annually the totals in the software match other recorded figures, e.g. an audit on the figures

Checking in the accounting software and/or the spreadsheet that totals are correct, particularly if the spreadsheet was set up by one or more people.

Where finances are collected or handled, especially cash, at least two club members should participate and confirm accuracy.

Similarly with assets approval would need to be given for any expenditure other that by petty cash e.g. above $50, and those assets recorded in an asset register or similar.

If standard accounting software is used there should be internal accuracy verified on that but where the system had been set up within the tennis club all amounts subtotals and totals should be manually verified/audited regularly to ensure accuracy.
SECTION C

Question 9

(a) This was answered as given in examiners notes, most candidates only gave a couple of answers. Not many of them talked about looking at comparable software, or that it needed to be tested on different types of platforms and equipment.

(b) This was answered well and most answered this completely, talking about update costs, ongoing maintenance and clear procedures for software support.

Sample Answers

(a) Go through all the normal phases of testing software including have their own staff check to ensure that it is as accurate as possible, supplying some test copies of it and equipment so can check that it works in the field as well as on the desk. They may also refer it to more senior people in their service, and medical staff to verify accuracy claims.

Would pay to also find prices of comparable software to know whether economically it is good value for money.

They also made may also be tested on a wide range of equipment so that as the hardware changes it is quite likely that the software package would still be adaptable.

(b) For good software support the ambulance service would be looking for guarantees of ongoing maintenance, eg. immediate versus monthly support, and have quite specific update costs (which would be built into the contract). There would also be consideration of how urgently the developers responded to either a query or an urgently-required correction.

Because of the problems related to many people sometimes requesting contrary requests, there would need to be a clear procedure in place for the ambulance service to direct its requests for specific software support, e.g. future enhancements might build in more video or audio material, or allow querying back to the ambulance base.

Question 10

(a) Some candidates talked about ‘design’ as structure eg security, hosting – these were seen as valid answers. Whichever answer option was used, this was answered quite well – they discussed logic of structure, clarity. Not many discussed keyword search.

(b) This wasn’t answered overly well, some candidates discussed clarity of display, and cutting down the information for the smart phone. Some discussed being in obscure locations, but didn’t talk about it being damaged, or testing it in difficult locations.
(c) Many applicants took this from the point of view of not needing internet access if they bought the full application, which was actually a good point. Many talked about cost successfully.

Sample Answers

(a) The web-based design would be primarily based on a hierarchy of menus so therefore very strong consideration of the hierarchical structure and how well each section is accessible is essential. They would also need a very strong search process so that entering 1/2/3 keywords would very quickly give access to the relevant parts.

Clarity of presentation is essential, being in the field means the ambulance paramedics would have little time to waste trying to decode or understand text or images which are not very clear, so an option to enlarge photos is important.

Other than that, the normal processes of making sure information is logically organised would apply.

(b) On different hardware the main considerations are likely to be the size and clarity of the display and how information is put into the computer e.g. soft or hard keyboard are alternatives as is vocal input, although in a medical situation that would probably have insufficient accuracy.

Lot of testing about the ruggedness and suitability of the input and output mechanisms is important.

Often paramedics would be attending in times of adverse weather so robustness of the hardware to moisture, dirt, shaking, had been dropped, will be important.

It is likely that has smartphone version would not be as helpful but it may be possible to show some information in a simpler way than, eg. holding a laptop or netbook.

(c) The advantage of buying the full application is perhaps it is a one-off purchase cost and provided the maintenance agreement was clear about the ongoing costs of maintenance then the majority of the cost is an upfront purchase cost. That may suit the ambulance service, or they may prefer to have a lower cost spread across every year as an ongoing contract, which is clearly linked with the maintenance requirements.

Presumably in both cases there are a specific number of copies of the software (application or website) permitted.

Question 11

(a) This was answered in quite a simplistic manner – many talked about cost, and reliability, but not as many as I thought would do.
(b) This was answered well, most discussed cost, access, quality of communication.

Sample Answers

(a) To be able to use broadband communication from an ambulance would mean using preferably 4G mobile phone communication from the ambulance. In many cases where this was desired, e.g. in hilly or remote regions, there may be limited access to the 4G network.

In other situations where this might be required, e.g. at major sporting events, the mobile phone network might be very crowded and good access to the network may not be guaranteed - is it possible for them to purchase/guarantee preferred access on the mobile phone network?

For that reason satellite communication would be a viable alternative, but the costs of having ready access to satellite may be prohibitive.

In both cases the bandwidth of communication should be quite reasonable provided not too much information is communicated. This would mean some form of direct communication, e.g. Skype, would be possible but may only be acceptable in quality. Providing the communication systems would not be a very significant cost, and their reliability should be extremely high.

(b) The advantages are obvious - it gives all the communication between the ambulance and specialist/hospital that would be expected. That would mean that people requiring medical assistance should be able to expect a good quality of advice.

In many situations where this could be used, having access to multiple specialists simultaneously, would be extremely helpful.

Disadvantages would be to do with the cost of the system, access to people who might be able to provide the quality technical support (i.e. specialists) and quality of the communication. Of course ambulances are still limited in the type and amount of care they can give by what they physically have access to, but it does mean that the ambulances can communicate with hospital(s) more effectively.

Question 12

(a) This was answered well, with most understanding who was at fault for different options, though most just dealt with the data being faulty. A lot commented on the fact that the ambulance officer should be able to do the task without the app, so there shouldn’t be a problem.

(b) This wasn’t answered well. Some talked about theft, and privacy of data, but not many talked about encryption or remote sensing.
(c) Candidates discussed copyright, server login and authentication via codes, etc. Not many talked about having purchased a licence, not the software, and only one or 2 talked about trial versions.

Sample Answers

(a) Quite clearly the problem with a faulty software upgrade is the software supplier’s problem, and almost certainly that would be detailed in the purchase contract.

‘First Aid Providers’ would be obliged to guarantee that the upgrade was accurate and correct, and to the best of their capability, correctly applied.

One way of doing this is guaranteeing that it is done on the ambulance service’s LAN network (for security and proof), and full authentication/verification checking done before the upgrade is ‘signed off’. (This is only where there may be incorrect data copied, not that the information itself is incorrect.)

If there was any suggestion that it was not, it would be up to First Aid Providers to fix it. ‘First Aid Providers’, if proven to have supplied a faulty upgrade, would be legally liable both for injuries incurred and possibly deaths caused. However in many situations the advice has to be interpreted, and it may be that an upgrade being viewed for the first time does not answer all questions and leaves the paraprofessionals in the situation of interpretation, in which case their advice then becomes part of the legal discussion.

Another possible reason for a faulty software upgrade is either operating system error or some other issue within the computing equipment. This may be more to do with the purchaser’s situation.

(b) The purchasers, i.e. ambulance services, would be expected to take all possible efforts to guarantee that their equipment was stored, protected and not easily stolen at all times. However in situations where ambulance staff might be attending, e.g. major accidents, there are many difficult situations involved, many people around and sometimes many hours involved. These present numerous challenges in guaranteeing that no equipment is lost or stolen.

So some possible alternatives would be fully-encrypted computer data, building remote sensing information into the computing equipment so that readily-locatable by a phone call, having situations so that as soon as the laptop was started by a non-owner it immediately communicated that it belongs to the ambulance service and needs to be returned to them immediately.

The social issues of private and confidential data, photos, advice, etc. being made available are highly significant, as they may be used in legal situations.

Therefore it would be expected that purchasers of the software would make all necessary endeavours to guarantee high levels of security.
(c) Yes, the better the software the more likely it is to be copied. That means the software developers should be looking at:

- making sure copyright is quite clearly stated,
- making quite clear to any purchaser that they had purchased a licence, not the actual software,
- in each trial phase only Demonstration versions are viewed and tested,
- being clear on all procedures so that only authenticated users/purchasers can logon. This may require, for example, server authentication of each logon. An alternative would be some form of a dongle or in more current versions, fingerprint identification, iris recognition or some other biometric way of personal verification of an individual user. This presents problems though, because there may be many users and they do not rigidly use an individual computer.

Copyright would need to be identified in any country to which this might be, in error, copied and sold so all possible countries where this could be a problem would need to have copyright explored and specifically stated.

That would mean that they may choose to have people constantly looking in other markets, i.e. overseas, and through their contacts in ambulance services, to make sure that inappropriate copies were not being sold.

SECTION D

This was a poorly answered section with only 17% of candidates scoring B or higher over the three criteria.

Criterion 1 was the most successfully met although candidate responses were generally shallow.

A number of candidates obviously ran out of time and made no attempt at answering Question 16.

Section D was an interesting scenario with the potential to explore databases and spreadsheets in depth as well as look at the relatively new but growing use of RFID technology. The social and ethical issues are particularly relevant and have impacted on the development and roll out of the technology. The lack of depth in the answers were indicative of a number of things and one cannot overlook the fact that it was the last section in the booklet or on the USB drive so the candidates may have not left themselves sufficient time to answer the questions in sufficient depth.
Question 13

(a) Most candidates were able to identify the likely stakeholders who may have an interest in purchasing the system.

(b) The candidates found discussing the advantages and disadvantages of the system to the Parking Providers difficult. They had not read or understood the question. Quite a few candidates mentioned the advantages and disadvantages to the Users not the Providers.

(c) Many candidates did not seem to understand what the word Scope means. Very few of the candidates were able to look at the issues and constraints that Toyota would face. Many candidates focused on the market value of the vehicle and some candidates wrote about the potential lack of interest by Toyota purchasers in having the technology but generally the candidate’s focus was very narrow.

Sample Answers

(a) Two types of businesses that the inventor might approach would be the companies that provide existing parking, eg. local city council and a private car park operator. Another type of business that might think there is something to gain from it would be a well-established business that thinks that they can gain a marketing advantage by linking their name with this, for example a multinational retail company or a local business which thought it might make good profits if they helped promote this.

(b) Some advantages for parking providers would be:
  • they may be able to encourage extra cars to park at their stations,
  • the company may be able to collect more revenue because meters won’t run out,
  • they might be able to promote a discount scheme to encourage more people to join, they may be able to open new car parks based on this idea,
  • city councils control on-street parking, so less checking of the parking meters may be possible if more cars guarantee to pay with this technology (ie. lower meter-inspection costs, or wider coverage?),
  • similarly, private car park operators may need to do less checking of cars overparked if this system guarantees car parking costs will always be paid.

Some disadvantages for parking providers might be:
  • people who use this technology will have to buy it or will be given it, so someone has to pay to own the technology. The parking providers might not want to spend this money. Specifically the parking providers will have to adapt their parking meters and voucher stations, which would probably involve significant expense.
  • they may not in fact attract extra cars to park at their stations,
  • even with advertising, the uptake of this new system might not be very good, and the parking providers might lose money if they discount charges.
(c) Toyota would be faced with these issues:
- how easy is it to fit the technology in all new Toyotas,
- at what cost could they fit the technology in new cars,
- would any potential buyers of cars suggest this is a good reason to buy one,
- can Toyota guarantee that the system will not affect any other car operations, if this is implemented in only one city or state, or how large can be it,
- on what scale should project be?

Constraints then might include:
- cost of technology,
- cost of building into cars,
- limited applicability in all states and regions (initially),
- marketing advantage versus possible cost disadvantage,
- those responsible will ‘forfeit’ total ownership of the technology once it is fitted in the
- Toyota cars (Toyota or someone else).

Question 14

(a) There was a mixed response to this question with candidates choosing either a spreadsheet or a database. There was little discussion regarding the row and column structure or tables, fields etc with only the best candidates coming anywhere near answering this question effectively.

(b) Some candidates answered this question as a hardware question with recommendations for backup and storage. These candidates were not penalized, as this question was ambiguous.

Sample Answers

(a) Either a database or spreadsheet solution would be suitable. If there are two car parks and 100 parking meters adapted database okay, and spreadsheet okay.

For a simple list of information a spreadsheet is probably the simpler option to effectively do this. Row and column structure, for example installation details, maintenance details, call outs in columns and the details of each RFID meter are down the rows.

A database could continue to incorporate facts about the situation and there may be other info about each individual parking station. The database offers a row and column structure where there is a table identifying each individual RFID device fitted to a car, and repair history. Another table could either keep details of when the parking was used (on the RFID device), or just the last time that it was used, with the full financial record available on MCC’s server.
(b) From (a) above either a database or a spreadsheet would be suitable in storing the daily usage data usage point.

Each column in spreadsheet could represent times parking place in use, perhaps 5 min intervals (occupied).

In a database a record for every individual’s parking station use of RFID device could be kept every 10 or 15 mins and then analysed according to street, actual parking bay’s number, ID of specific car which controlled it or any other way of looking at that data.

Question 15

(a) Very few candidates actually addressed the field types and the relationships between the tables. The best candidates made an attempt at analyzing the diagram but many candidates did not even show evidence that they had considered the tables etc. This raises the question as to whether the digital presentation was unclear or difficult to access. The candidates tended to just make a simple statement that the database was adequate for the task but gave limited justification for their response.

(b) This question really highlighted how little the candidates know about RFID technology. Some candidates recognized the potential risks inherent in having an RFID chip accessing the users bank account but there was obviously a dearth of understanding of the technology. Some candidates inferred in their answers that RFID was actually a company.

(c) This question was quite well understood and candidates gave a number of reasonable options for adding funds to the system including Smartphone apps, online websites, credit cards etc.

Sample Answers

(a) This is a very limited database structure.

In the User table the RFID ID is a text field, as it is in the Deductions table. This means it will not be a one-to-one and onto linked field. Similarly in the Deductions table Meter ID is a text field while the same field in the Location table is a number field, which means those two cannot be mapped onto each other (as shown in the relationships diagram).

The Date&time field in the Deductions table should not be shown as text.

Each of the ID fields is showing uniquely as Autonumber, but those fields are not linking/being used in any useful way.
(b) The RFID device could certainly arrange direct transfer of the money from a bank account into user's parking account if it was given the necessary details. With limited operational controls on the RFID device, this might be more difficult to set up.

However, once set up properly it should work automatically. This may involve slightly more technology in the RFID device than was intended. So economically it is may be quite okay.

Practically, perhaps not too sure whether many users would want to give this device that much control over a bank account. Most people are very hesitant to allow bank account details to be easily accessed in other ways.

(c) Two other ways that this could be done would be by a credit card to provide transfer details over the phone, or by accessing any Internet-enabled device.

(d) All of these three possibilities may suit different types of people.

Credit card transfer over the phone might be easy for many people who already use a similar arrangement, and should not take too long.

Accessing an Internet-enabled device might be difficult when car parking and do not have a lot of time. However many people can do that from the phone and would regard it as quite okay.

The first possibility of direct transfer of money between the user's bank account and their parking account seems the best. Requires setting up correctly once and should be very easy to work with at any later point. People who trusted the device and had no concerns with its reliability may find that the best possibility.

Question 16

(a) Very few candidates addressed the security issues of the technology. RFID technology has obvious security issues with the potential for the signal from the chip being captured from a scammers device for example. Almost no candidates recognized the potential for data skimming and the need for data security.

(b) Many candidates suggested the use of CCTV to keep an eye on parkers but few actually considered the actual technology – both hardware and software as well as the trial process.

(c) This question was generally well handled in as far as candidates were able to suggest other uses of the technology however there were few who considered the social and ethical issues of the use of the technology in these scenarios.
Sample Answers

(a) Until the technology is tested it would not be possible to guarantee total security unless systems used in the RFID device had already been widely tested and proven in other environments. It is essential that unless otherwise independently verified that technology would need to be fully tested for security.

It is quite possible that if the system is not highly secure others would be able to forge those market transactions, so both the parking providers and potential users would need to be quite certain that full security testing had been done by independent testers.

It would be a legal concern to all people involved if micro-transaction rip-offs were found. It would be expected to damage the credibility of the device and the trial, making it more difficult for other such trials to happen and raising more doubts about unapproved access to bank information.

(b) If the trial process had covered as many possibilities of inaccurate data as possible they should be able to show records where they had tested particular aspects and there were unlikely to be incorrect. That would cover many possibilities like:

- how far from the receiving station can the RFID device guarantee secure, reliable transmission of data,
- can the data easily be incorrectly communicated,
- has the micro-transaction technology been fully proven.

However, because it is part of a trial all participants in the trial would need to be aware that there may be limitations and the intention of the trial is to identify these limitations. They would probably be very tolerant of situations where all the facts may not be known. That would mean evidence which conflicted with the testing process information should be fully explored to help identify any deficiencies in the system.

(c) There are many areas that micro-transaction technology can be used, with or without RFID, include:

- paying for small purchases e.g. coffee (payments of generally less than a few dollars),
- where there are small, repeated purchases at the time, e.g. paying for drinks at a concert,
- RFID technology is already used a lot in tracking goods and cargo, particularly in transport environments.

In a simple way all of these applications have very supportive social and ethical considerations when they have been proven to work correctly. Provided the technology is known to work correctly and reliably, and that there were only small amounts of money involved in the micro-transactions, it is likely that this technology would be readily accepted and continue to be developed.
### INFORMATION TECHNOLOGY AND SYSTEMS (ITS315108) – 2012
(subject to refinement)

<table>
<thead>
<tr>
<th>Criterion</th>
<th>A+</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D+</th>
<th>D</th>
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<tbody>
<tr>
<td>Demonstrate detailed knowledge and comprehensive understanding of a range of problem solving and project management strategies</td>
<td></td>
<td></td>
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<td>demonstrate good knowledge and clear understanding of a range of problem solving and project management strategies</td>
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<td>demonstrate sound knowledge and understanding of some problem solving and project management strategies</td>
<td></td>
<td></td>
<td>demonstrate some knowledge and understanding of some problem solving and project management strategies</td>
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<tr>
<td>Provide several clearly articulated and reasonable examples of strategies that could be used in the scenario given</td>
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<td></td>
<td>provide at least two suitable examples of possible strategies that have some application to the scenario given</td>
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<td>provide only one strategy, or alternatives that may include impractical or unreasonable ideas</td>
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<tr>
<td>Critically analyse the ways in which these strategies might be used in various contexts</td>
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<td>Analyse the ways in which these strategies and skills might be used in various contexts</td>
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<td></td>
<td>Recognise and describe how these strategies and skills are used in familiar contexts</td>
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<td>Provide some explanation of how these strategies and skills are used in familiar contexts. Limited links made to the given scenario.</td>
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Page 1 of 2
| Criterion 2 - Demonstrate knowledge and understanding of the components of an information system, and their inter-relationships | A+ | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| meet all the above criteria | accurately describe the components of an information system, and their inter-relationships in various contexts, and analyse the ways in which the components might be used | describe the components of an information system, and their inter-relationships in the contexts given | describe the components of an information system, and their inter-relationships in familiar contexts only | present some relevant information on components of an information system, and some of their inter-relationships |
| meet most of the above criteria | present a comprehensive list of components that are well described | provide a suitable list of several components that are described | provide information about relevant components with short description of their application | give a restricted list of components, with little description |
| meet some of the above criteria | critically analyse the capabilities and characteristics of alternatives for an information system in various contexts | analyse the capabilities and characteristics of alternatives for a component of an information system in given contexts | compare the capabilities and characteristics of alternatives for a component of an information system in familiar contexts only | present information on one alternative for components of an information system, without discussion of alternatives |
| meet few of the above criteria | use appropriate terminology to accurately describe the use of information technology, showing broad understanding | use appropriate terminology to describe the use of information technology, showing good understanding | use appropriate terminology to describe the use of familiar technology, showing basic understanding | use acceptable / limited terminology to describe some familiar information technology |

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| Criterion 3 - Demonstrate knowledge and understanding of social issues associated with information systems | A+ | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| meet all the above criteria | recognise, analyse and describe in detail social issues associated with information systems in various contexts | recognise and describe social issues associated with information systems in given contexts | recognise and describe social issues associated with information systems in familiar contexts only | comment on some social issues in familiar contexts only |
| meet most of the above criteria | consistently demonstrate a responsible attitude to the use of information systems | demonstrate a responsible attitude to the use of information systems | demonstrate a responsible attitude to the use of information systems | mostly demonstrate a responsible attitude to the use of information systems |
| meet some of the above criteria | consistently apply relevant ethical principles in the development and use of information systems | apply relevant ethical principles in the development and use of information systems | apply some ethical principles in the development and use of information systems | aware of and apply some ethical principles in the development and use of information systems |
| meet few of the above criteria | comment on some social issues in familiar contexts only | poorly demonstrate a responsible attitude to the use of information systems | demonstrate a responsible attitude to the use of information systems | simply demonstrate a responsible attitude to the use of information systems |
| meet few of the above criteria | almost demonstrate a responsible attitude to the use of information systems | apply ethical principles in the development and use of information systems | apply ethical principles in the development and use of information systems | not very well demonstrate a responsible attitude to the use of information systems |

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### Award Distribution

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### Student Distribution (SA or better)

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<tr>
<td><strong>Last year</strong></td>
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