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General Certificate of Education

2016

Centre Number

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Candidate Number

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Applied Information and Communication Technology

Assessment Unit A2 7

assessing

Unit 7: Investigating Systems



A6J11

[A6J11]

MONDAY 23 MAY, MORNING

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Answer **all eleven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.
Quality of written communication will be assessed in **questions 2, 6, 9 and 10**.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
This paper is accompanied by a Case Study. You must **not** use your own annotated copy of this Case Study.

ADVICE TO CANDIDATES

You are advised to take account of the marks for each part question in allocating the available examination time.

For Examiner's use only			
Question Number	Marks available	Marks	Remark
1	10		
2	6		
3	6		
4	10		
5	10		
6	6		
7	10		
8	15		
9	15		
10	6		
11	6		
Total	100		

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Danny has selected the Super Solutions consultancy firm to develop a new computer system for his business.

- 1 Anne Jones, the senior analyst, has identified **five** problems. Complete the table by explaining the impact of each problem on DANNY’S DINERS and suggesting how a new computer system could resolve each problem. Provide **different** responses in each case.

Problem 1: Uncontrolled access to the booking diary by many members of staff.

Impact on Danny’s Diners:

How a new computer system could resolve this problem:

Problem 2: Poor records of stock requirements noted on whiteboard.

Impact on Danny’s Diners:

How a new computer system could resolve this problem:

Problem 3: No analysis of staff absences or rotas.

Impact on Danny's Diners:

How a new computer system could resolve this problem:

Problem 4: Danny is sometimes behind on payments to suppliers.

Impact on Danny's Diners:

How a new computer system could resolve this problem:

Problem 5: The only communication between the two restaurant premises was by telephone.

Impact on Danny's Diners:

How a new computer system could resolve this problem:

[10]

Examiner Only	
Marks	Remark

3 Anne has considered the following ideas in an effort to improve the current system:

- Staff could be given handheld devices for taking orders;
- Staff could select menu items by tapping items on the device screen;
- Handheld devices could connect wirelessly with a server on which a database that stores the orders could be installed;
- Kitchen staff could view orders on a computer screen and indicate when they are complete.

(a) Suggest **three** problems that might arise from this proposal.

Problem 1: _____

Problem 2: _____

Problem 3: _____

(b) Suggest **three** benefits that might arise from this proposal.

Benefit 1: _____

Benefit 2: _____

Benefit 3: _____

[6]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

4 Paul researches possible systems development methodologies. Complete the paragraphs opposite by selecting the correct words or phrases from the list provided.

systematic	small	email	prototyping
structured	face-to-face	bottom-up	entity flow modelling
data	feasibility study	large	dynamic
agile	time-boxing	iterative	control
traditional	analysis	top-down	collaboration
data flow modelling	aggregation	abstract	incremental

The Structured Systems Analysis and Design Methodology (SSADM)

covers most of the traditional systems development lifecycle from

_____ to system design. It takes a _____

approach where a high level picture of the system requirements is gradually

refined into lower levels of detailed design. Documentation is produced at

the end of each stage. It is useful for systems which are well-defined and

large. It has been often used for Government projects. SSADM uses the

techniques of _____ and Entity Relationship Modelling.

The Dynamic Systems Design Methodology (DSDM) is an

_____ methodology meaning that there is continual change

and improvement. It is _____ (phases are repeated until the

desired result is achieved) with continual _____ releases (a

little bit at a time) to the users. The technique of _____ which

fixes the deadline of each iteration and implements the requirements in

order of priority is used. There is an emphasis on _____

communication rather than documentation. The project manager encourages

_____ and team work. It is most useful for small, novel

projects where the requirements are more uncertain. The technique of

_____ is used allowing high user involvement and feedback.

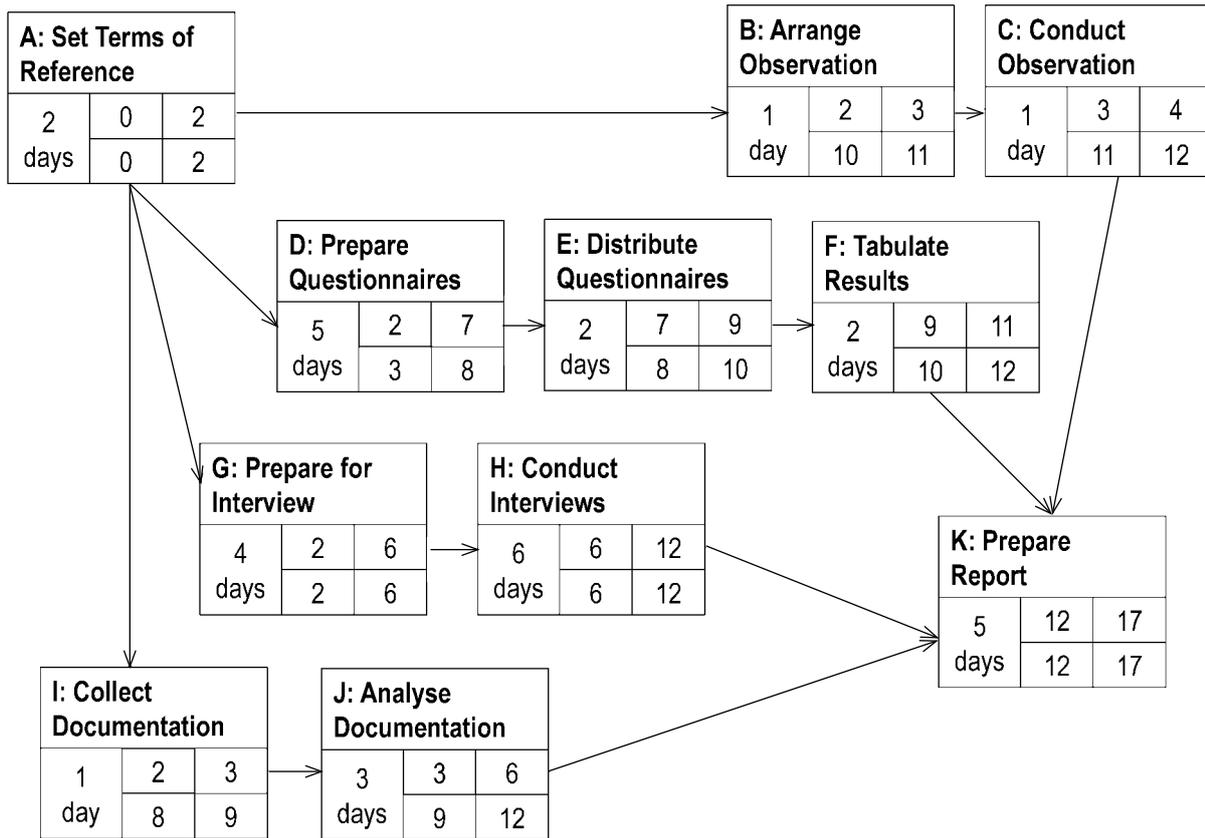
[10]

Examiner Only

Marks

Remark

5 Paul has created the network diagram shown below.



(a) Paul needs to extract information from the network diagram. Complete the following table.

Information Required	Answer
Estimated duration, in days, of activity H: Conduct Interviews.	
Float available, in days, for activity I: Collect Documentation.	
Activity which is dependent on task F: Tabulate Results.	
Predecessor of activity J: Analyse Documentation.	
Earliest finish time, in days, for activity C: Conduct Observation.	
Latest start time, in days, for activity E: Distribute Questionnaires.	
All activities on the critical path.	

[7]

Examiner Only	
Marks	Remark

7 Anne constructs a set of Data Flow Diagrams (DFD) to represent the current situation at Danny's Diners. Complete the table below by placing a tick (✓) beside each element to show its role within the system.

	Entity	Data Flow	Process	File	None
customer					
final reminder					
take booking					
customer booking details					
booking diary					
manage accounts					
waitress					
supplier invoice					
food					
list of average table times					

[10]

Examiner Only	
Marks	Remark

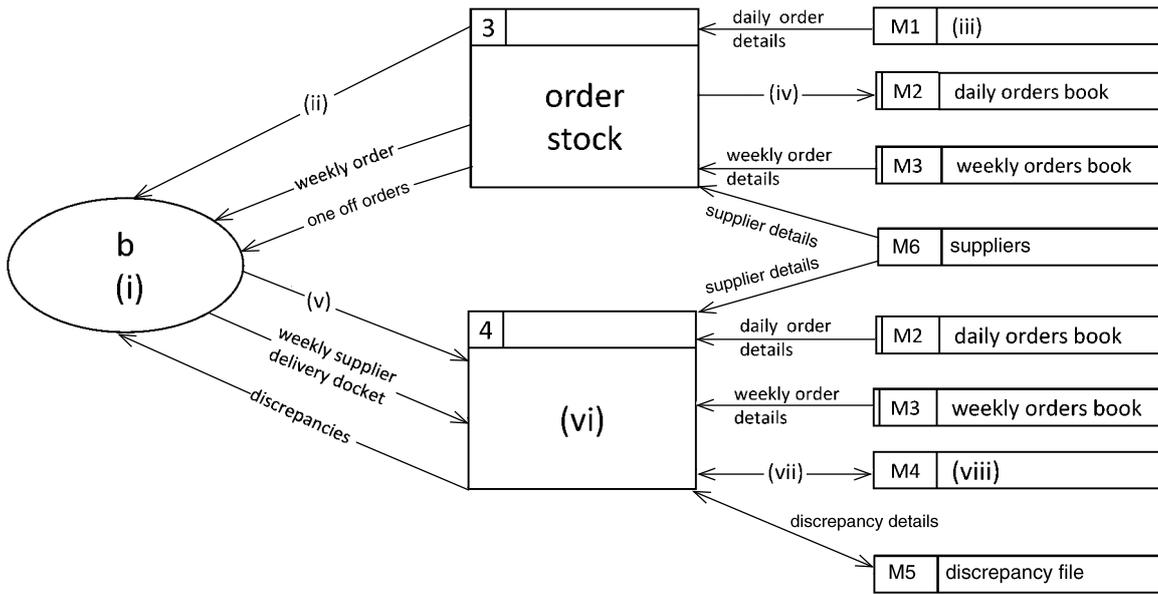
- 8 (a) Complete the following table, comparing context and level-1 DFDs. Indicate which statements are **true** and which are **false**.

A context diagram contains more than one process.	
A context diagram shows data stores/files.	
External entities have an alphanumeric id.	
A complete level-1 DFD shows all processes within the system boundary.	
A level-1 DFD shows both internal and external data flows.	
All the external data flows on a context diagram should be present on the corresponding level-1 DFD.	
The identifier for a manual data store/file contains the letter M and an electronic data store/file contains the letter E.	

[7]

Examiner Only	
Marks	Remark

(b) Complete the following partial level-1 DFD. Identify the missing elements in the spaces provided.



- | | |
|-------------|--------------|
| (i) _____ | (v) _____ |
| (ii) _____ | (vi) _____ |
| (iii) _____ | (vii) _____ |
| (iv) _____ | (viii) _____ |

[8]

Examiner Only	
Marks	Remark

- 9 Anne starts to design part of the database to hold information currently stored in the booking diary. Extracts of the booking diary are shown below.

Booking Diary Extracts

1st May 2016

18:00-19:00 Bob Bean, Tel: 028 70653666, No in party: 409, table 3 reserved.

Michael Melon 07790555111, 4 in party, table 2

Ingram Love 02890536627, 7 in party, long table. CANCELLED

Table 3: Betty Baker - arrived

19: 00-20:00 Frances Berry, 10 in party, birthday, table 2. Arrived.

4 in party, table 2, Cecil Colander – 10 mins late – sitting at table 1

20:00-21:00 Michael Melon 02890536633, 7 in party, table 1 – now 6 in group

Vince Valentine, 2 in party. Phone 67829990. Wed Anniversary.

5th May 2016

18:00-19:00 George Grille, Tel: 02870653666, No. 10, table 3 reserved.

Ingram Love 02890536672, 2 in party, table 2 – date did not arrive.

19: 00-20:00

20:00-21:00 Mr Valentine 028 67829999, 2 people, t. 2. Special Occasion.



(b) Anne creates a primary key for each of the database tables as shown in the table below:

Database table	Primary Key
CUSTOMER	CustomerNo
BOOKING	BookingNo
DINING TABLE	TableNo

(i) Explain the purpose of a primary key.

[1]

(ii) Describe how relationships can be formed between the CUSTOMER, BOOKING and DINING TABLE database tables.

[2]

Examiner Only	
Marks	Remark

(c) Describe **two** queries that could be designed for Maureen and suggest how each query could benefit her.

Query 1

_____ [1]

Benefit of Query 1

_____ [1]

Query 2

_____ [1]

Benefit of Query 2

_____ [1]

(d) Describe **one** report that could be designed for Danny and suggest how this report could benefit him.

Report

_____ [1]

Benefit of Report

_____ [1]

Examiner Only	
Marks	Remark

- 11 Paul and Danny discuss potential issues that might arise when the new system is in operation.

Complete the table below by suggesting and justifying the most appropriate support solution for each issue.

Issue	Most Appropriate Support Solution	Justification
Danny has discovered an error with a validation rule.		
Maureen cannot remember how to update prices on the lunch menu.		
The server has crashed and staff are using a temporary paper-based system to record orders and deliveries.		

[6]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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**Applied Information and
Communication Technology**

Case Study
Assessment Unit A2 7

assessing

Unit 7: Investigating Systems

[A6J11]

MONDAY 23 MAY, MORNING



A6J11CSI

DANNY'S DINERS

Danny McNeil is a fully qualified chef with many years of experience managing hotel kitchens and restaurants. He worked for many years in England before returning to his native city of Belfast in Northern Ireland in 2010.

Danny returned home to embark on a long planned business venture. He intended to open a group of high-quality affordable restaurants that would especially appeal to families. Danny wanted to provide healthy meals using locally grown produce and meat. He wanted to emphasise good, nutritionally balanced meals that did not involve any processed food. He was keen to encourage people to minimise their fast food habits and return to old fashioned wholesome recipes.

Danny deliberately did not seek premises in the city centre. He wanted to target more residential areas where there were likely to be young families that would benefit from his ideas.

Danny rented premises at a small shopping complex where other facilities included a garage, a pharmacy, a hairdressing salon, a butcher shop and a chip shop. The first restaurant opened in January 2011 with promotional offers and a lot of local advertising.

Danny thoroughly researched a range of local suppliers and farmers, and committed to an initial six month fixed contract for supplies with those whom he considered best suited to his needs.

Danny was very cautious to begin with. He did not want to overstretch himself financially in case things did not work out. He initially did all purchasing, preparation and cooking himself, just employing two kitchen assistants, three waiting staff and a part-time cleaner.

It was not long before word got around about the type of meals that were being served at the restaurant. The food was excellent, designed to encourage good eating habits and give people an opportunity to dine out without spending an extravagant amount of money.

The restaurant opened to the public every day at 9 am, although Danny was there at 7 am. It remained open until 11 pm with last orders taken at 9 pm. Tea, coffee and bakery items were provided until midday, cooked lunches from 12–4 pm and evening meals from 5 pm–10 pm each day.

The response to the restaurant was incredible. People were happy that they did not have to go into the city to eat out. They were delighted that there was somewhere local of such quality, suitable for a family outing, within a sensible price range and with something to suit everyone.

Within six weeks of the opening, Danny realised that unless he increased his staff resources, he would be unable to manage. He employed an assistant chef, another kitchen assistant and two more waiting staff so that he could build in some sort of a rota for help in the kitchen as well as the dining room.

This helped ease the workload a bit. Danny did not want to give customers the idea that the staff were always under pressure. He wanted to create a pleasant relaxed atmosphere. However, these new arrangements did not ease his personal schedule.

Danny wanted people to be able to arrive for evening meals whenever they wanted without being tied to a tight booking system. However this very quickly turned into a booking nightmare that he soon had to address. Staff in the restaurant had to deal with dissatisfied customers who had been looking forward to an evening out and did not want to have to stand around and wait for a table to become available. The diners themselves were uncomfortable with people watching to see how quickly they might finish and many customers just decided that they would have to go elsewhere.

Danny also had an unrealistic expectation of his capacity to manage everything including sourcing stock for the restaurant, ordering stock, accounting, staffing and marketing as well as cooking and engaging with his customers.

Three months after the restaurant opened, Danny employed a manager, Maureen Magee, to assist the day-to-day running of the restaurant. He was hopeful that along with her restaurant role, Maureen would be able to help oversee the stock issues that were arising. Unfortunately this did not work out as well as he had hoped.

Because they were so busy Maureen frequently ended up taking orders, serving and clearing tables herself. This was not her intended role and resulted in her not being able to devote sufficient time to her other duties.

Maureen was very good at organising the staff and dealing with customers. However she was already struggling to organise a suitable way of dealing with customers who arrived at all times and expected to be served. Customers were sometimes left standing for quite a while and some just gave up and left feeling very dissatisfied. This was most definitely not good for business.

Danny reluctantly agreed to introduce a booking system for evening meals. However he decided to allow his no reservation policy at lunch time for some tables as a compromise.

Customers could ring or come into the restaurant to make a booking up to one week in advance. They were required to supply their name, address and telephone number. This information was recorded in a booking diary by whichever member of staff was passing the phone at any particular time. The staff were always busy and sometimes scribbled down vague information, even placing it on the wrong day for the wrong time. Less experienced staff sometimes gave away a large table for just two or three people. On other occasions, they would underestimate the average time usually allocated to diners to complete their meal or they would overlook the fact that a special celebration should be allocated additional 'table time' before accepting another booking. Maureen had created a list of average 'table times' for staff to use when taking a booking so that as many tables as possible would be occupied at all times.

When customers arrived for bookings, the word 'arrived', was written in the diary beside the customer details. Again with staff being so busy, this sometimes did not happen and when the booking diary was checked, it appeared some guests had not arrived. This resulted in phone calls to see if they were coming or not. It was very embarrassing when guests received phone calls while eating and made the restaurant management look inefficient.

Customers were issued with a bill which they paid by either cash or card. They were then supplied with a receipt.

Although Danny had started with some fixed contracts with local suppliers, there were so many items to source that it was an almost impossible task. There were daily orders for fresh vegetables, meat, fish and dairy products to work out each afternoon so that orders could be placed for next-day delivery.

Weekly orders were created on Friday afternoons for delivery the following Tuesday. Orders for other items used in the preparation of the food as well as in the maintenance of the restaurant were placed on a one-off basis as required.

Danny had a very simple view of ordering stock but it was surprisingly naïve for someone with his experience. He had a whiteboard on the kitchen wall and when he wanted to make a note of a product required for the next day, he would write it on the board. To place the order he copied the items from the board into his 'Daily Orders' book and either delivered the list or rang it through to the supplier involved. The items would be delivered the next day accompanied by 'daily supplier delivery dockets'. The delivery dockets were supposed to be placed in a Delivery Docket box file.

Unfortunately sometimes Danny did not remember to write the item on the board and it would not be ordered at all or else he remembered when he was delivering the list or placing the phone order. This resulted in there being no written record of the order created and caused confusion when deliveries were made. Danny also frequently neglected to write the amount of the item he required. If Maureen placed the order when Danny was not available, she just had to guess the amount required.

With fresh produce, problems clearly arose if the items were not ordered or if too little or too much was ordered. No proper checking of stock deliveries took place at all. The kitchen assistants were supposed to mark off the items delivered against those in the Daily Order book, but again this did not always happen because the staff were so busy.

Weekly orders depended on larders, fridges and the storeroom being checked for low stock items. This could be anything from eggs, flour and rice to cleaning products. Items for re-order were written into the 'Weekly Orders' book and after identifying the correct supplier, an order was compiled and sent to the relevant supplier usually by Fax or e-mail. When the weekly supplier orders arrived they should have been accompanied by a 'weekly supplier delivery docket'. This should have been checked off against the weekly order and discrepancies noted and followed up with the supplier. They were also supposed to be placed in the Delivery Docket box file. Again because the staff were always so busy, there was a great deal of slack involved in the process with an inevitable follow on impact.

Delivery Dockets in the Delivery Docket box file should have been properly marked off against the orders and sorted and stored by date into daily and weekly orders.

Danny was determined to save money by dealing with all of his accounting processes himself. Again, this was not the best idea. Suppliers sent in invoices according to their own billing cycle with a requirement to pay within a certain time scale. Supplier receipts would follow. Danny did his best to spend at least one day each month dealing with his accounts but unfortunately because of his limited understanding of accounting, payments for goods sometimes got a bit behind and reminders and final reminders were issued. On several occasions, suppliers refused to deliver orders until bills were paid.

Danny had no proper reports from his records. Although he maintained staff records and leave records, he had no real way of seeing any patterns of staff absence, or staff rotas over a period of time. He had no way of knowing what meals and recipes were the most or least popular and he had no way of predicting stock requirements. When Danny had to complete Tax Returns and deal with VAT Inspectors, it was a major task.

Despite the difficulties that were arising, the business was clearly thriving. Danny now decided to provide cooked breakfasts as he recognised that in the mornings there was a different type of customer apart from the 'morning coffee' shoppers. To facilitate this he decided to open at 7.30am and immediately employed two additional part-time staff to cater for the rush hour. Danny also tried to develop his lunch time provision to cater for the trade that came from the local college and business community. He refused to provide fast food and managed a very different simple menu that included home-made soups and salads.

In November 2012, Danny was presented with the opportunity to open another restaurant in a similar setting in another part of the city. This was exactly what he had planned and the second restaurant opened in February 2013. He made Maureen overall manager for the two sites and employed two assistant managers, one for each restaurant, another two assistant chefs, three kitchen staff and four waiting staff as well as two further part-time cleaning staff. He decided that all staff should work some shifts at both premises so that customers would have the same dining experience in both.

Danny implemented the same ordering, booking and accounting procedures at the second restaurant. However he now wanted to place all orders for the two premises together. The only communication available between the two restaurants was by telephone. There was no way of viewing stock or looking at records. A further complication was that orders were not always delivered to the right restaurant. Managing the stock for the two sites and dealing with the accounts became extremely difficult.

Existing problems surrounding other aspects of the restaurants began to escalate quickly and with Danny already talking about a third restaurant, Maureen and the two assistant managers asked for a meeting to discuss the issues. It was clear to everyone that a serious review of all procedures was urgent and that Danny needed to consider speculating on suitable technology.

Danny realised that his real skills lay in cooking and that it was time to seek professional assistance. He contacted an accountant friend, who recommended the consultancy firm, Super Solutions.

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