ADVANCED
General Certificate of Education
2015

Applied Information and Communication Technology

Assessment Unit A2 7
assessing
Unit 7: Investigating Systems

ML

[A6J11]
FRIDAY 22 MAY, MORNING

TIME

2 hours, plus your additional time allowance.

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 4, 5, 7 and 8**.
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	Marks available	Marks	Remark
1	8		
2	6		
3	9		
4	6		
5	6		
6	10		
7	6		
8	14		
9	19		
10	10		
11	6		
Total	**100**		

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Danny has employed the consultancy firm Super Solutions to examine his restaurant business with a view to developing a new computer system.

1   Anne Jones, the senior systems analyst, wishes to determine problems within the business. Complete the table below by describing two problems Anne is likely to find in the areas identified.

Area	Problem 1	Problem 2
Bookings		
Stock		
Staff		
Finance		

[8]

2 A new software team is selected from the staff of Super Solutions to develop the new computerised solution for Danny's Diners.

Identify two activities undertaken by each member of the team.

Project Manager _____

_____

_____

_____

Analyst _____

_____

_____

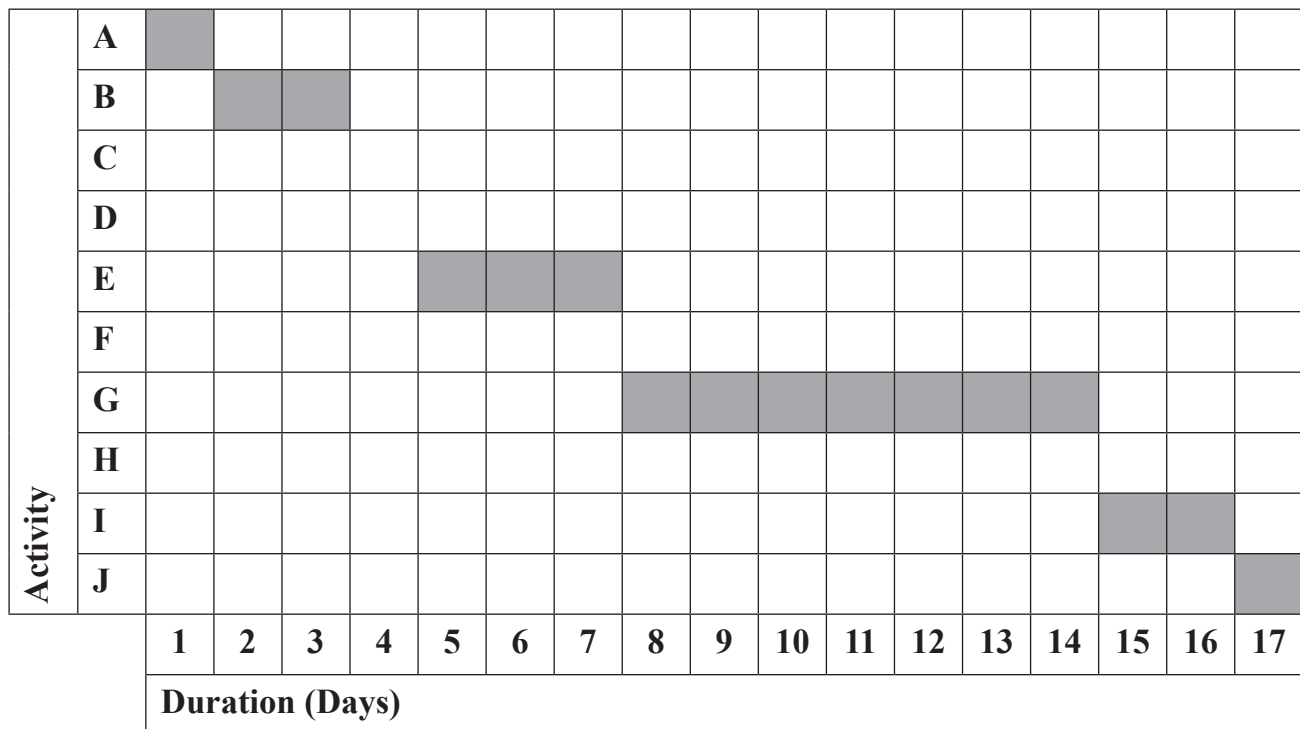_____

Programmer _____

_____

_____

_____ [6]

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(Questions continue overleaf)

3 Peter, the project manager, needs to give Danny an estimated completion date. He starts by identifying tasks, estimating their duration and determining their predecessors. These are shown in the table below.

ID	Activity	Duration	Predecessors
A	Conduct initial discussions	1 day	—
B	Interview key staff	2 days	A
C	Review documentation	1 day	A
D	Observe procedures	1 day	B
E	Compile feasibility report	3 days	D
F	Develop specification	3 days	C, E
G	Create Database	7 days	C, E
H	Develop prototype	6 days	C, E
I	Conduct testing	2 days	F, G, H
J	Train users	1 day	I

(a) Add the missing tasks to the Gantt chart below, using the information in the table above.

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
A	■																
B		■	■														
C																	
D																	
E					■	■	■										
F																	
G								■	■	■	■	■	■	■			
H																	
I															■	■	
J																	■

Duration (Days)

[4]

(b) Task G [Create Database] took 1 day longer than expected.

  (i) How would this delay affect the overall completion date, if no corrective action is taken?

  _____

  _____ [1]

  (ii) What corrective action, applied to specific tasks, could Peter take to ensure the project was delivered on time?

  _____

  _____

  _____

  _____ [2]

(c) Another chart that Peter could use for monitoring projects is a network diagram. Give **two** advantages of using a network diagram instead of a Gantt chart.

Advantage 1

_____

_____

Advantage 2

_____

_____ [2]

4 Anne wants Danny to understand that different approaches can be taken to the development of a new computer system for Danny's Diners.

Consider the possible use of SSADM or DSDM in the development process at Danny's Diners. Justify the approach that you would recommend.

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_____ [6]

5 Describe three items of documentation that are produced throughout the software development lifecycle including their purpose and content.

Your answer should make reference to the purpose of each item of documentation as well as to its content.

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_____

_____ [6]

6 Anne will investigate the current system in Danny's Diners.

(a) Place a tick (✓) against the most appropriate fact-finding technique that Anne should use to discover the information listed.

Information	Interview	Observation	Documentation	Questionnaire
When customers are celebrating a special occasion they often run over the allocated time.				
How Maureen feels about her job role and duties.				
The information required by Government for VAT and TAX returns.				
Evidence that deliveries are being checked against the supplier orders.				
The high priority business areas to be included in the new system.				
Customer satisfaction with the current ordering system.				
The workload that staff experience in a typical day.				
Larger tables are usually not fully occupied yet large groups are often turned away.				

[8]

(b) Give **two** advantages of using interviewing over questionnaires.

Advantage 1

_____

_____

Advantage 2

_____

_____ [2]

7 Anne recognises the importance of ensuring that user needs are met in any new system.

Discuss features that could be implemented in the new system for the benefit of two specific end-users.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

8 Anne intends to use Data Flow Diagrams to analyse and document the current system at Danny's Diners.

(a) Complete the context diagram shown below identifying the missing elements. Write your answers in the spaces provided.
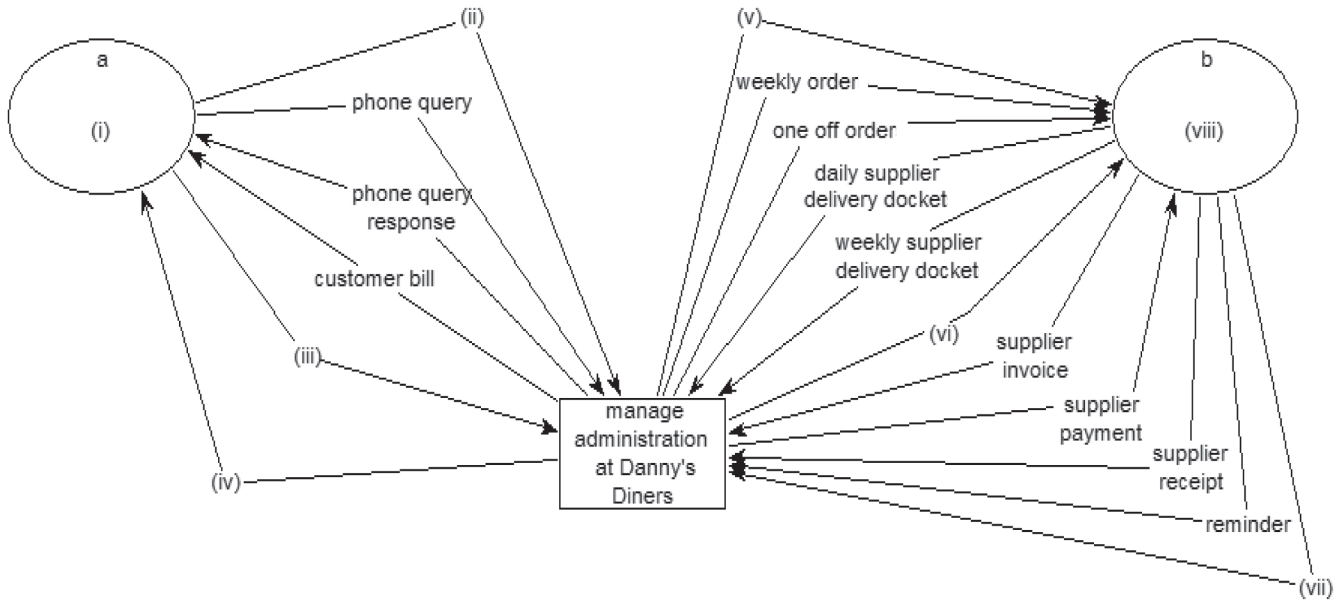
CONTEXT DIAGRAM FOR ADMINISTRATION AT DANNY'S DINERS

		Examiner Only	
		Marks	Remark

(i) _____ **(v)** _____

(ii) _____ **(vi)** _____

(iii) _____ **(vii)** _____

(iv) _____ **(viii)** _____

[8]

(b) Discuss how data flow diagrams should be used during the analysis process at Danny's Diners.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

9   Anne has started to draw the ER diagram for part of the new system. She examines documentation to help her determine the relationships between the tables. Some examples of the documentation are shown below.

Example of part of the Menu:

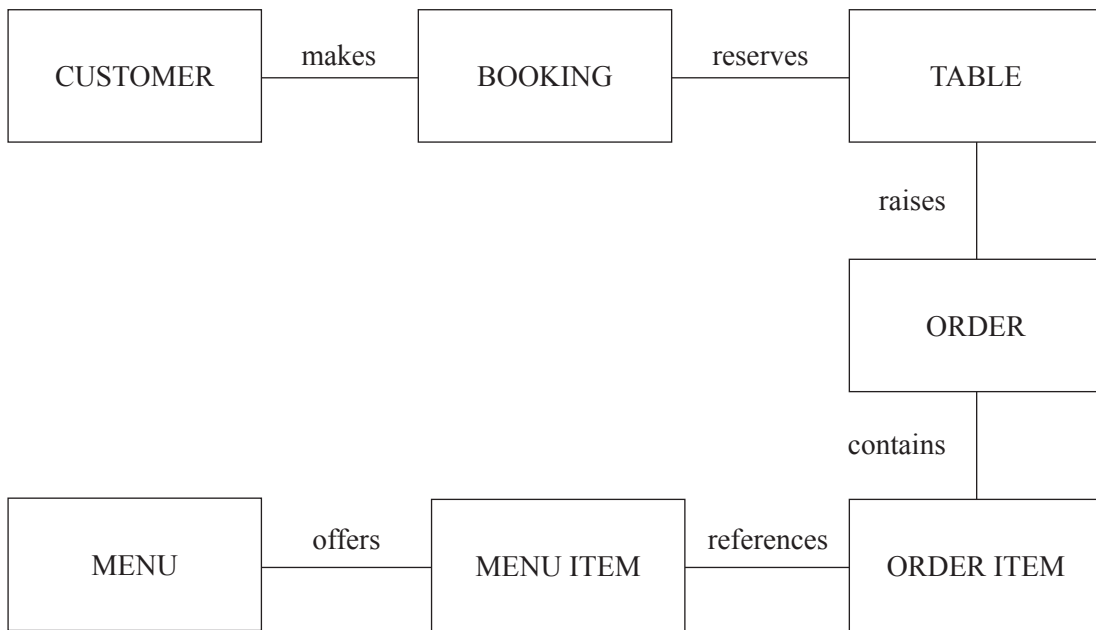| MENU	
Carrot Soup	£2.00
Potato and Leek Soup	£2.00
Broccoli Quiche	£3.10
Caesar Salad	£2.10
Tomato and Mozzarella	£3.00

Example of an entry in the booking diary:

1st May 2015	
18:00-19:00	Grace Farmer, Tel: 028 70653666, No in party: 4, table 3 reserved.
18:00-19:00	Michael Morecambe, 02890536627, 7 in party, table 6.
19:30-20:30	Frances Forbes, 10 in party, birthday, table 3.

Example of orders taken by a waitress:

Order No: 13	**Order No: 14**	**Order No: 15**
Date: 1st May 2015	Date: 1st May 2015	Date: 2nd May 2015
Time Order: 17:00	Time Order: 17:30	Time Order: 17:10
Table 4	Table 4	Table 5
Carrot Soup	Raspberry Brownies	Rib Eye Steak
Caesar Salad	2 x Apple Crumble	Spiced Salmon
2 x Peanut Chicken		
Thai Noodles		

(a) Add the missing notation to Anne's ER diagram for the six relationships shown.

```
┌──────────────┐  makes  ┌──────────────┐  reserves  ┌──────────────┐
│              │─────────│              │────────────│              │
│   CUSTOMER   │         │   BOOKING    │            │    TABLE     │
│              │         │              │            │              │
└──────────────┘         └──────────────┘            └──────────────┘
                                                             │
                                                          raises
                                                             │
                                                     ┌──────────────┐
                                                     │              │
                                                     │    ORDER     │
                                                     │              │
                                                     └──────────────┘
                                                             │
                                                          contains
                                                             │
┌──────────────┐  offers  ┌──────────────┐ references ┌──────────────┐
│              │──────────│              │────────────│              │
│    MENU      │          │  MENU ITEM   │            │  ORDER ITEM  │
│              │          │              │            │              │
└──────────────┘          └──────────────┘            └──────────────┘
```

[6]

(b) Using the information provided, identify with a tick (✓) which table(s) in the database will contain the following data items. Note that a data item may be present in more than one table.

Data Item	CUSTOMER	BOOKING	TABLE	ORDER	ORDER ITEM	MENU ITEM	MENU
Customer number							
Customer phone number							
Quantity ordered of each menu item							
Time period when the lunchtime menu is offered							
Waitress name							
Date and time of order							
Price of lentil soup							
No of customers in the group							
Maximum number of seats							
Special Occasion?							

[10]

(c) Booking Number is chosen as the primary key for the BOOKING table. Explain why booking time or date is not used as as the primary key.

_____

_____ [1]

(d) Suggest **one** validation rule that could be applied to each of the following fields.

Booking Date

_____

_____ [1]

Total Number of People in Party

_____

_____ [1]

10 Anne prepares her test plan as early as possible in the software development lifecycle. Fill in the missing blanks in the passage opposite, using the words from the list below. Each word can be used only once.

users	technician	acceptance	phased
program	separation	independently	approval
analyst	algorithms	integration	programmer
together	system	software	performance

This project will use four levels of testing including _____ testing which tests individual units of code to check how they work _____. The tests will be designed and executed by the _____. They will check that the _____ are correctly implemented, according to the detailed design specification, by choosing test data that is correct, invalid and extreme and at the boundaries of any conditions and loop counters in the code itself.

When the entire code for a large subsystem is ready, such as the booking system, the analyst will perform _____ testing. This tests how the individual components of code work _____ as a group.

Once all the subsystems have been developed and tested the system can be tested as a whole. This is called _____ testing and will be carried out by the _____. This will ensure that all the functional and non-functional requirements have been met according to the requirements specification.

The _____ of the system will then be invited into Super Solutions to perform _____ testing to ensure that it meets their business needs and is fit for purpose. If the system is approved the client will be asked to sign-off the new system.

[10]

11 Anne must manage the installation of the new computerised system and agree a contract for support and maintenance.

(a) Anne is considering which method of changeover to use for the implementation of the new system. Give **one** reason why Anne might consider each of the following methods for Danny's Diners:

Phased

_____

_____

Pilot

_____

_____ [2]

(b) Describe a method of support that would be appropriate for Danny's Diners and give an example of when it might be used.

Method of Support

_____

_____

Example

_____

_____ [2]

(c) Suggest **two** reasons why the new system may have to undergo maintenance after installation.

Reason 1

_____

_____

Reason 2

_____

_____ [2]

THIS IS THE END OF THE QUESTION PAPER

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2015

Applied Information and Communication Technology

Case Study
Assessment Unit A2 7

assessing

Unit 7: Investigating Systems

[A6J11]

FRIDAY 22 MAY, MORNING

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 in to 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 in to 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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