Rewarding Learning
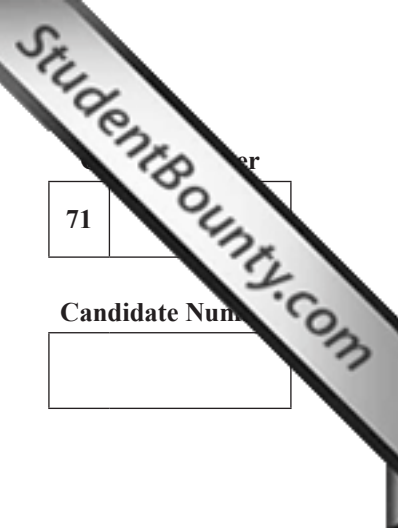
ADVANCED
General Certificate of Education
January 2013

Applied Information and Communication Technology

Assessment Unit A2 7

assessing

Unit 7: Investigating Systems

[A6J11]

A6J11

THURSDAY 17 JANUARY, 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, 4, 9 and 11.**
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	6		
2	6		
3	8		
4	11		
5	6		
6	8		
7	13		
8	13		
9	12		
10	11		
11	6		
Total	**100**		

8351

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1 Fred McCurry, the analyst at Flexible Futures wants Fiona to fully understand the impact of problems in the company. He has documented two problems and has asked her to consider each by giving **one** answer to each question in the table below.

	Problem 1	**Problem 2**
	Fiona spends two hours searching the rails for an angel costume. She knows that someone hired it out two months ago. She cannot find it. She asks Doreen, the secretary, to telephone the customer who has ordered it and explain the reason it cannot be hired.	David, the driver, delivers a wedding dress to the address given by Doreen. The old age pensioner at the house says it is not for her. He rings Doreen who finds two other addresses in the books for the customer named Mrs Smith.
Why did it happen?		
What is the effect on the business?		
What is a possible solution?		

[6]

2 Fred has told Fiona he will write a feasibility report that will help her decide on a suitable option. These options are detailed in the table below.

Option A	**Option B**
Doreen, Frances and Fiona will each have a PC connected to a Local Area Network.	Doreen, Frances and Fiona will have a laptop connected to each other across the Internet.
Schedules will be printed for the employees and delivery man.	The delivery man will be given a portable device to record deliveries at each house. Employees will be able to view emails on mobile phones with schedule information.
The database and web server will be located on the business premises.	The database and web server will be remotely located on the premises of a hosting company who will manage it.
Customer payments will be processed in the office using customised software developed for Fiona's Fashions.	Customers will pay their accounts over the Internet using an e-commerce system purchased from the hosting company.
Employees will work in the new office.	Some employees will work at home.

Evaluate both proposals considering and comparing a range of issues suitable for inclusion in a feasibility report.

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3 Fred wants to investigate the current system using a range of fact finding techniques.

Complete the table below, stating the fact finding technique Fred would use to obtain the information described and explain why that technique is suitable.

| Information Required	Fact Finding Technique	Reason for Choosing Technique
How Fiona thinks the business will develop in the future.		
How Doreen and Fiona deal with customer enquiries relating to the fancy dress hire.		
Customers' opinions of the different services at Fiona's Fashions.		
The information recorded about wedding, fancy dress, alterations and household orders.		

[8]

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(Questions continue overleaf)

4 Fred wants to discuss systems development methodologies with Fiona. He starts by creating a diagram for the five stages of Dynamic Systems Design Methodology (DSDM).

(a) Complete the diagram below by selecting the correct stage from the list.
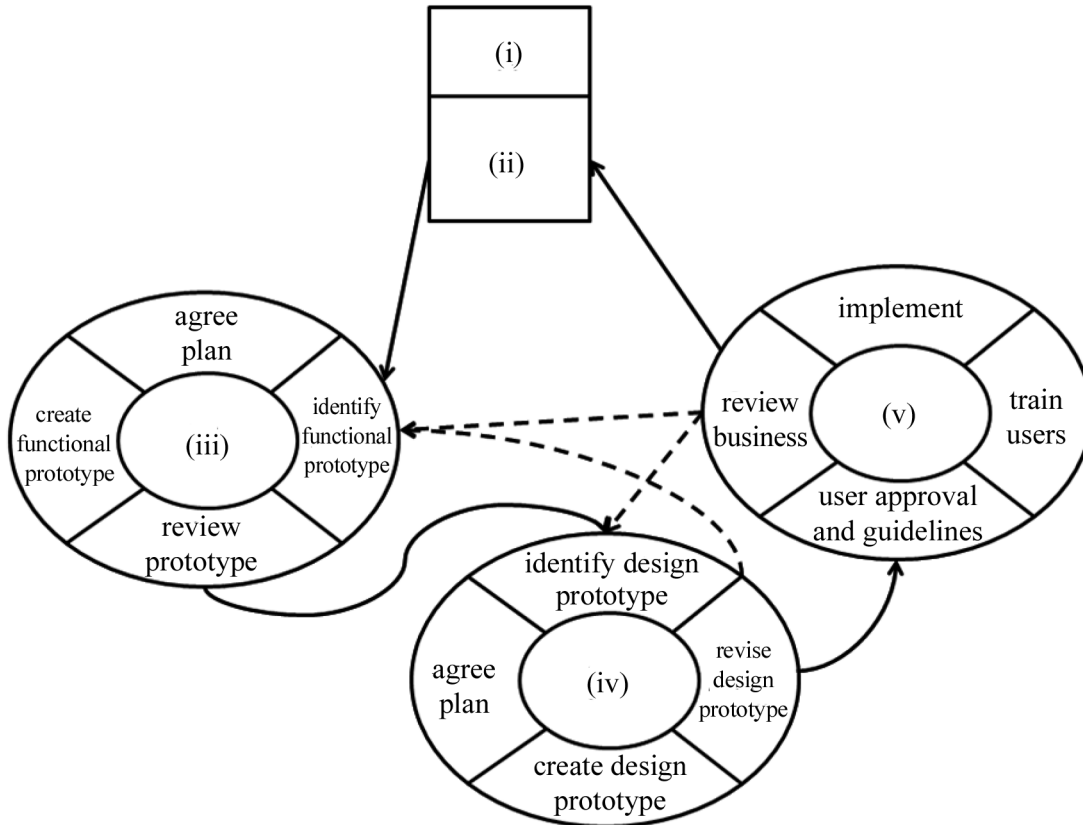
Adapted from © DSDM; A framework for business centred development by Jennifer Stapleton, 1997, published by Pearson Education (copyright holders). No further duplication is permitted other than for teaching and study

Functional Model Iteration
Implementation
Feasibility Study
Design and Build Iteration
Business Study

(i)	
(ii)	
(iii)	
(iv)	
(v)	

[5]

(b) Fred decides to provide Fiona with notes comparing and contrasting the characteristics of Dynamic Systems Design Methodology (DSDM) with Structured Systems Analysis and Design Methodology (SSADM). Provide suitable notes in the space below.

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5 Fred has identified tasks and wants to allocate responsibility for them.

In the table below, identify with a tick (✓) the person who should be responsible for each task.

Note that each task can only be assigned to one person.

Task	People			
	Fiona	**Analyst**	**Programmer**	**Technician**
Approve Project Proposal				
Design Algorithms				
Create DFD				
Create Overall Test Plan				
Develop the Training Guide				
Perform System Backups				

[6]

6 Fred lists the different types of information he found in his investigation of the current system. Before he starts the data modelling process he categorises them into inputs, outputs, files and processes.

Complete the following table by inserting a tick (✓) to indicate the category to which each item belongs.

Information	Categories			
	Input	**Output**	**File**	**Process**
Customer Enquiry				
Manage Accounts				
Itemised Bill				
Signed Timesheets				
Alterations Notebook				
Stack of marked off delivery dockets				
Cost Orders				
Reminders				

[8]

7 **(a)** Fred creates Data Flow Diagrams (DFD) to show the flow of data through the current system.

Complete the following partial level 1 DFD for Fred by identifying the missing elements. Write your answers in the spaces provided.
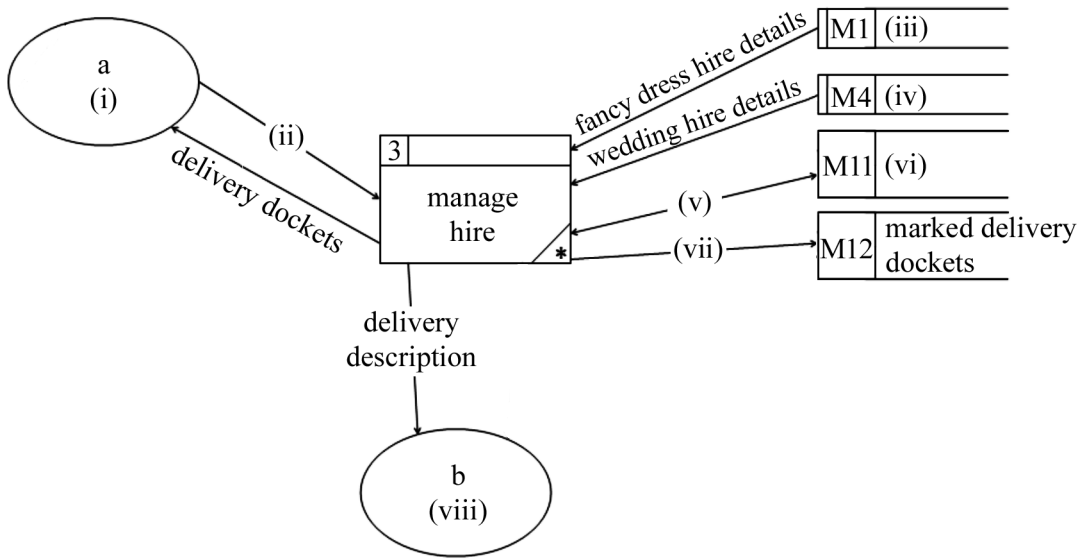
(i)		(v)	
(ii)		(vi)	
(iii)		(vii)	
(iv)		(viii)	

[8]

(b) Fred shows Fiona his Level 1 DFD. Provide answers to the questions Fiona asks about his DFD.

(i) What do the arrows represent?

_____

_____ [1]

(ii) Why do some data stores have an extra line compared to the others?

_____

_____ [1]

(iii) Should the **manage hire** process be the third process to be completed?

_____

_____ [1]

(iv) What is the purpose of the letters a and b?

_____

_____ [1]

(v) When the new system is designed some data will be stored electronically. How will that be indicated on the new level 1 DFD?

_____

_____ [1]

8 Customers will be able to hire individually designed fancy dress costumes and wedding dresses. Fred has looked at the notebooks named Fancy Dress and Weddings, which Fiona uses in her old administration system. He begins the new database by creating three tables: CUSTOMER, HIRE AGREEMENT and COSTUME STOCK.

(a) Give **two** reasons why Fred has reorganised the data found in the Fancy Dress and Weddings notebooks.
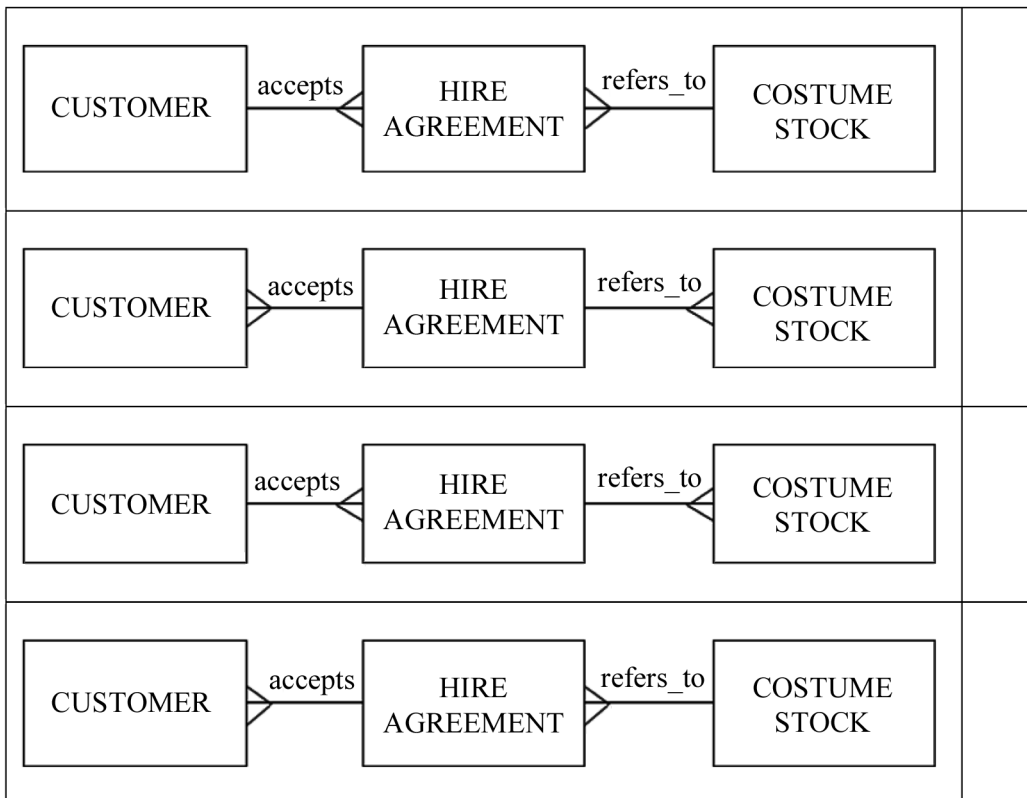
Reason 1

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Reason 2

_____

_____ [2]

(b) Fiona wants every customer to accept a hire agreement (tailored to each customer) for each individual costume they hire. Identify with a tick (✓) the data model which describes the correct relationship between the tables CUSTOMER, HIRE AGREEMENT and COSTUME STOCK.

[1]

(c) Complete the following section of the data dictionary relating to the HIRE AGREEMENT table. Note any primary and foreign keys.

Field Name	Data Type	Comments/ Validation	Sample
HireAgreementNo	Text		HA1099
CostumeStockID		Foreign Key to COSTUME STOCK Table.	CSTK0056
CustomerID	Text		CUST1111
DateHired	Date	The date the hire agreement was signed.	24/12/2012
NoDaysHired		Must always be whole number.	7
ReturnedDate		Must be > DateHired	30/12/2012
AgreedCost	Currency	After applying any promotional discounts to the standard cost.	£20.00
OverDueCostPerDay		Must be to whole pounds, no decimal places.	£5
DepositPaid	Currency	Amount of deposit left.	£30
DepositReturned		Was deposit returned?	Yes

[7]

(d) Describe how a suitable query which will identify costumes that have not been returned could be designed, using the HIRE AGREEMENT table.

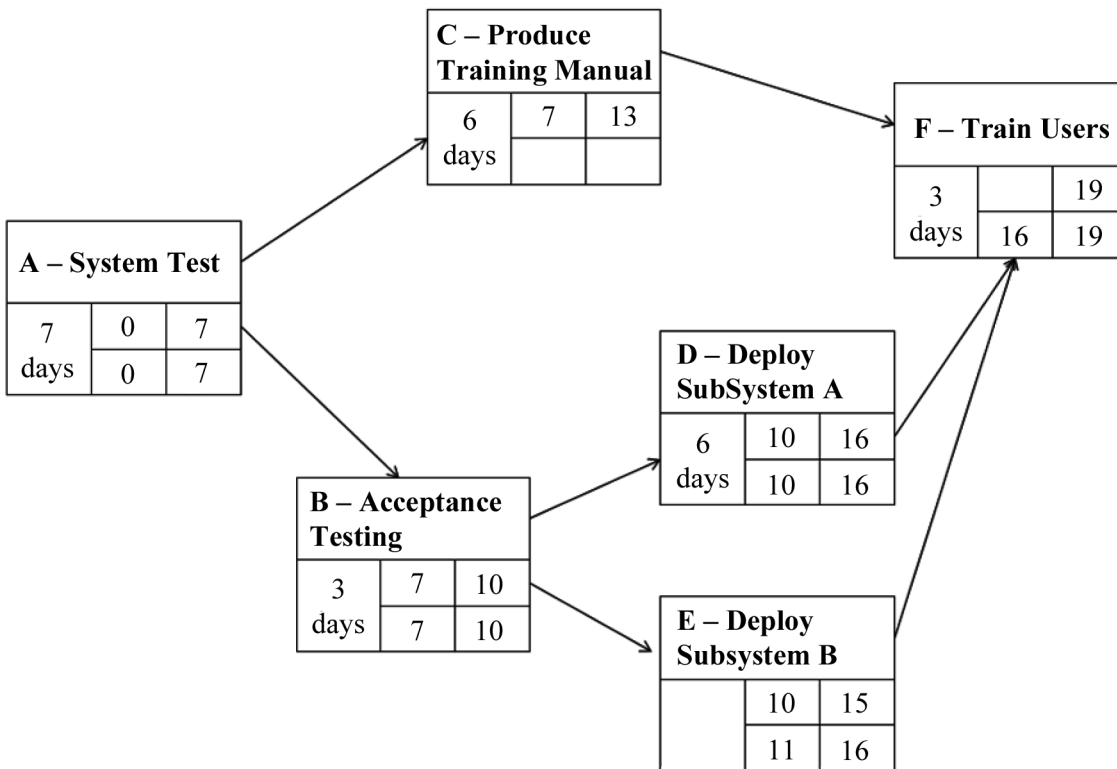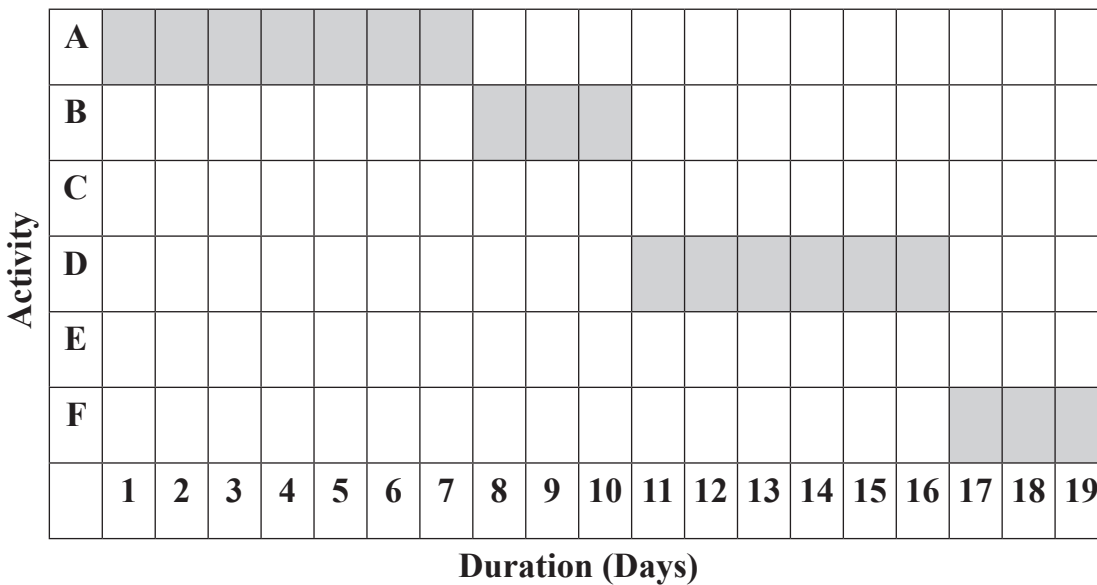_____

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_____ [3]

9 The project is now at the system testing stage and Fred is updating his project plan. He has used both a network diagram and a GANTT chart.

(a) Complete the network diagram.

C – Produce Training Manual		
6 days	7	13

F – Train Users		
3 days		19
	16	19

A – System Test		
7 days	0	7
	0	7

D – Deploy SubSystem A		
6 days	10	16
	10	16

B – Acceptance Testing		
3 days	7	10
	7	10

E – Deploy Subsystem B		
	10	15
	11	16

[4]

(b) Complete the GANTT chart.

Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
A	▓	▓	▓	▓	▓	▓	▓												
B								▓	▓	▓									
C																			
D											▓	▓	▓	▓	▓	▓			
E																			
F																	▓	▓	▓

Duration (Days)

[2]

(c) Discuss the characteristics of GANTT charts and network diagrams. In your answer give examples of useful information they provide for project managers.

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10 The programmer implements a query called Qry_CustomerPayments. The
    design specification for this query is shown in the table below.

Qry_CustomerPayments	
Purpose	Given a unique customer number, reports all payments made by the specified customer.
Input	CustomerNo
Output	rpt_CustomerPayments

He then runs several tests to ensure that the code operates correctly and
meets the design specification.

(a) What type of testing is the programmer performing?

    _____ [1]

(b) Describe **two** types of data that the programmer might use to test the
    query.

    Data type 1

    _____

    _____

    _____

    Data type 2

    _____

    _____

    _____ [4]

(c) What type of testing includes the users?

    _____ [1]

(d) Which document, created at an earlier stage of the systems
    development lifecycle, would the analyst use to guide the type of
    testing identified in part (c)?

    _____ [1]

(e) Now that Fiona has seen the system in action it is realised that the database structure may be incorrect. What impact would making a change in the database structure have at this stage of the systems development lifecycle?

Consequence 1: _____

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_____

Consequence 2: _____

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_____ [4]

11 The last important stage in a traditional systems development lifecycle (SDLC) is maintenance. Maintenance will probably be required as long as the new system is operating in the business and may be quite expensive.

Discuss the issues involved in maintaining the new system now and in the future.

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THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

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General Certificate of Education
January 2013

Applied Information and Communication Technology

Case Study
Assessment Unit A2 7

assessing

Unit 7: Investigating Systems

[A6J11]

THURSDAY 17 JANUARY, MORNING

FIONA'S FASHIONS

Fiona Fulton opened her business **Fiona's Fashions** in September 2006. Fiona had an [...]
talent for dressmaking and for many years worked from her own work room at home. She [...]
alterations, made all sorts of costumes and outfits, wedding dresses, bridesmaid dresses and [...]
range of household items including curtains and soft furnishings. She had a great way of
understanding exactly what a customer wanted and went to extraordinary lengths to deliver
quality products. Fiona had no need to advertise for business as her reputation made her very
well-known and people came from everywhere to get work done.

Fiona loved her work. In fact she really did not look upon it as work. She rarely turned anyone
away and often did not charge people at all. She frequently took on much more work than she
could realistically handle. The truth of the matter was that Fiona was not very good at the
business end of things.

Fiona made the decision to move into proper premises as a result of advice from her husband
Frank. Frank owned and managed a garage and had a real flair for business. Their daughter,
Frances, also saw great opportunities for development and persuaded her mother to listen. Frank
and Frances both knew that Fiona was working too hard for the amount of profit that was being
made. They realised that Fiona needed help to cope with the sheer volume of work that was
coming in. They also realised that there were many strands to the business that were growing and
developing.

Because of the sheer diversity of her work, Fiona could not keep on top of all of the issues that
arose. For example, Fiona had an excellent stock of fancy dress costumes that were available for
hire. People were always on the phone looking for particular items. However no one really knew
every item that was available or what sizes there were. Fiona had to look right through the stock
every time there was an enquiry. Indeed no one really checked on the items that were hired out
and sometimes items were not returned at all. The charging system was supposed to relate to the
number of days a costume was hired for but this system was seldom implemented properly.

The wedding aspect of the business was also a real growth area with enormous potential. Frances
could see that properly managed, this could be an incredible success. Currently it was quite
pressured.

The household requests were steady but tended to be time-consuming as Fiona insisted on going
to a customer's house to take measurements herself. Although absolutely right about this, it was
impossible for Fiona to do everything and inevitably, things got behind.

Alterations were a major part of the business but customers sometimes came to collect items and
they were not ready because Fiona had overlooked them.

Frank had watched Fiona's situation for a while before putting together a business plan. As a first
step he got her to agree to have three other people work with her at home. Fiona only allowed this
because she was getting to the stage where she was having great difficulty in getting everything
done. The design work on costumes and dresses was very time-consuming and sometimes took
much longer than she had anticipated. Fiona did not want to let people down but the alterations
began to get further and further down the list of things to do. She agreed that her three co-workers
could definitely handle the alterations as well as some carefully directed work on the costumes.

Wedding orders she insisted on doing herself as she considered the event to be so _____ that no one else could be trusted to do the work.

Fiona was more than a little haphazard when recording anything. The problem was that w___ business was small, she remembered most things and barely wrote anything down. While th___ might have been alright in the beginning, it was not long before it became a real problem. Some customers were not getting work done on time because dates were not noted, wrong alterations were being made because requirements were not written down accurately and in one dreadful event, a wedding dress had to be remade altogether because the wrong measurements had been applied. A great deal of time was being spent with customers who had genuine grievances. Fiona acknowledged these problems and again on Frank's advice began a system of notebooks, one for each area of the business.

Unfortunately, her ability to remember to write things into the notebooks was just as bad as her ability to remember them at all. At best the details recorded in the notebooks were basic.

She had hard-backed notebooks for 'Alterations', 'Fancy Dress', 'Household' and 'Weddings' as well as an additional notebook that she called 'Miscellaneous' and a notebook called 'Telephone'. The books were all ruled out in columns that were headed, 'Date', 'Customer Name', 'Address', 'Telephone Number', 'Requirements' and 'Completion Date'.

Sometimes people rang Fiona to enquire about getting work done, the cost, the timescale or to see if something was ready. Frank explained to Fiona that if these enquiries were recorded then anyone could answer the phone and a response could be made when the proper information was gathered if it was not readily available.

The decision to move to new premises was based on the fact that the business had really taken off. Fiona had far more work than she could manage and was in a position to employ her daughter Frances as the shop manager, as well as a secretary, Doreen Greer and a total of ten employees and a part time cleaner. She also started delivering costumes and wedding items using a driver, David Magee, whom Frank recommended. Frank also gave her the use of a specially adapted van.

As manager, Frances considered that it should now be possible to maintain the notebook system properly. Frances thought that she would be able to allocate work to the employees in a more efficient manner. She hoped that she would be able to concentrate her efforts on managing the accounts and stock issues that were currently problematic as well as implementing new plans that she had in mind for the business.

Frances required all employees to complete a signed weekly time sheet that identified the hours worked and the nature of the work completed. She thought that as well as providing payroll information, that this might also provide a useful cross-check for work done. However all of the staff including the cleaner and David found this a complete waste of time. It was always half completed in a hurry and although it was filed away, Frances did not always use it in the way it was intended.

In terms of accounting, customers sometimes paid by cash when items were collected. They should have been presented with a pre-prepared itemised bill and issued with a receipt. However because Frances and Doreen were so busy, this sometimes had to be done when a customer arrived. This was a real nuisance for customers who were often in quite a hurry.

For bigger orders, such as costume hire, weddings and household items, Fiona created invoices and sent copies out to customers. If payment was not received within two weeks, a reminder was issued. If another two weeks or more elapsed, then a final reminder was issued. Customer payments came in the form of card payments, sometimes cash and on the odd occasion, cheque. Frances intended to phase out the use of cheques in keeping with a lot of other businesses.

When payments were made receipts were supposed to be issued. In principle, this should have been a good system but in practice it was cumbersome and often inaccurate as a result of the original poorly recorded details and poor pricing.

Costing work was very difficult and Frances was very concerned that the business would lose money if something was not done about it.

Doreen was supposed to record all enquiries and provide all responses. She was also required to record details for all of the other books as well. Unfortunately this was not as easy as Frances had thought at first. Doreen had no real knowledge of how long it took to do things and sometimes totally underestimated the time involved and recorded unrealistic completion dates. If the phone was busy she would make brief notes and try to enter the details in the correct notebook later. Unfortunately, this did not always happen. Both Doreen and Frances found themselves recording details of long standing customers over and over again as each entry was regarded as something completely new. They both acknowledged the unnecessary duplication of information.

In addition, Fiona frequently changed entries in the books herself without telling Doreen and this was a source of great annoyance. Fiona also insisted on entering the wedding information herself. As before, the details she provided were minimal and on some occasions inaccurate.

With the increase in customer orders, stock was becoming an issue as well. There was no real system for reordering. Fiona had been so used to estimating requirements for herself that she thought this would still work. Frances tried to make a list of stock items and compile a list of suppliers. She tried to create supplier orders based on what she thought was being used by the staff. This was always done at the last minute and an additional problem for customers was that they might have to wait because the right zips or thread, buttons, material or whatever else was not available.

The control of the costume hire was clearly a major issue. There was no inventory of the stock and no real control over the return of items. Every time Fiona had a good idea for a costume, she might make a new item or adjust something that had not quite worked out for a customer and add it to the rails. She did not see anything wrong with this since as far as she was concerned she was merely increasing availability for hire customers.

When hire orders were taken and the delivery date was due, Doreen would issue David with customer address details and a brief description of the content of the delivery. He had to get customers to sign for the items delivered and then return the signed delivery dockets to Doreen who filed them away. When the items were returned, the dockets should have been marked off but again this was not a very efficient system and there was often confusion about returns, payments and whether or not the stock item had been returned or even existed in the first place. Customers should have been invoiced by Frances based on the records maintained.

Frances also had great ideas for developing the business, employing more staff and opening a separate costume hire outlet and a dedicated wedding boutique. She felt that Fiona was so totally committed to this aspect of the business that she would really enjoy doing this sort of work. This would clearly relieve some of the other issues that were arising. Frances also realised the potential for using the internet, in particular for the costume hire and wedding aspects of the business.

She also wanted to introduce some special services for customers including:

- **Fix It at Five**
  This offer would be available every day to the first five customers to arrive at 5pm. They did not have to ring or wait. Repairs and simple alterations that could be done within an hour would be accommodated. Normal prices would be applied. This service was very attractive to busy people who could call on their way home from work and get something done very quickly.

- **Fix It Friday**
  This offer would be available on the last Friday of every month and customers would get a percentage discount on the total price depending on what time they arrived. For example a customer arriving before midday would only pay 50% of the cost. A customer arriving between 12 and 3pm would pay 70% of the total cost and a customer arriving between 3pm and 5pm would pay 90% of the total cost.

- **Five Family and Friends**
  This offer would be extended to five people from a bride's family or her friends who wished to have specially designed outfits for her wedding. Discounts of up to 30% would be made depending on the order placed.

Frances was becoming increasingly alarmed at the growing problems in the business. She was disappointed at the fact that all of the good ideas and development work were being overshadowed by these issues. She found herself constantly fixing things. She realised that she herself had difficulty in prioritising procedures and recognised that she might need some help.

Frances decided that Fiona's Fashions needed some sort of a computer system and professional help. She sat down with Fiona and Frank and between them they agreed to employ the services of the computer consultants Flexible Futures.

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