



Information Systems Analysis

SAMPLE TIME CONSTRAINED ASSESSMENT MARKING SCHEME

This marking scheme has been prepared as a **guide only** to markers. This is not a set of model answers, or the exclusive answers to the questions, and there will frequently be alternative responses which will provide a valid answer. Markers are advised that, unless a question specifies that an answer be provided in a particular form, then an answer that is correct (factually or in practical terms) **must** be given the available marks.

If there is doubt as to the correctness of an answer, the relevant NCC Education materials should be the first authority.

Throughout the marking, please credit any valid alternative point.

Where markers award half marks in any part of a question, they should ensure that the total mark recorded for the question is rounded up to a whole mark.

Case Study

Express Espresso operates a chain of ten coffee shops in the south of England which until coronavirus hit, primarily sold their speciality coffee (light-roast, medium-roast and high-roast) and bakery products to customers face-to-face. Since then, they have started selling their own bulk bags of coffee beans, which are sold in sizes 1 kg – 5 kg, to both existing and new customers. In addition to their shops, they also have a small warehouse and head office. Many of the administrative staff have started working from home at least partly during the week and so remote working software has recently been installed.

Bulk buy coffee is paid for at the time of purchase. An order receipt is generated hand-written on paper (if ordered in store), orders made online receive an automated receipt and orders over the phone, receive a receipt typed up on office software by one of the administrative staff. Paper orders created in store are stored in a folder (along with a copy of the till receipt), then are sent daily by the store manager directly to head office, where the administrative staff will record them and forward them onto the warehouse. Payment for face-to-face orders is processed on the till, phone orders via a virtual terminal and online orders use an external online payment system. Bulk bags are stored at a central warehouse and are shipped within 24 hours of receiving an order.

The information system processes and stores data on customer payments, cancellations and refunds, as well as payroll data and payments made to suppliers. Their current information system consists primarily of databases storing data on customers, orders and payments, staff and suppliers.

Staff employed by *Express Espresso* include: Managing Director, Shop Managers, Baristas, Human Resources staff, Marketing staff, Finance staff, Payroll staff and Administrative staff.

Problems experienced within the system include: written orders (in store) not always being completed correctly/fully by staff members and administrative staff finding the completion of receipts for phone orders time-consuming. Experienced baristas do not have an effective way of disseminating their knowledge. The Managing Director has also complained of a lack of information provided about sales in shops.

Express Espresso has been recently purchased by a new owner, who wants to focus on increasing the sales of bulk coffee, but has concerns over the system's capacity to deal with higher demand and would like to fix the current issues and create a more efficient system.

The new owner would like you to analyse *Express Espresso's* Information System and make recommendations for improvement.

Answer ALL questions

Marks

Question 1

- a) In your investigation, a clear understanding of the current working of the system will be needed to help make recommendations for improvements. 4

From the case study, identify TWO (2) types of Information System that are currently being used and explain what they are being used for:

Award 1 mark for each correct IS and a further 1 mark for suitable explanation (related to Case Study)

- ***Transaction Processing System (1) e.g. Purchasing/Payroll (1)***
- ***Office Automation System (1) e.g. Office software for creating receipts/Teleworking software (1)***

- b) Identify TWO (2) new types of information system that could benefit the company. Explain why each would be useful. 4

Award 1 mark for correct IS (up to two) and a further 1 mark for suitable justification (related to Case Study) If more than 2 IS are discussed, mark only the first 2.

- ***Decision Support System (1) provide MD with reports on sales data from all shops, to enable higher level decisions (1)***
- ***Knowledge Management System (1) baristas share knowledge of coffee-making techniques across shops (1)***
- ***Management Information System (1) provide Managers with income/expenditure information so that they can readjust their budget as necessary (1)***

Total 8 Marks

Question 2

- a) Create a Level 1 Data Flow Diagram which shows the current Order System within a Coffee shop.

8

Award marks as follows;

1 mark for correct notation (Gane/Yourdon)

1 mark for identifying Customer as Entity

1 mark for Process Order

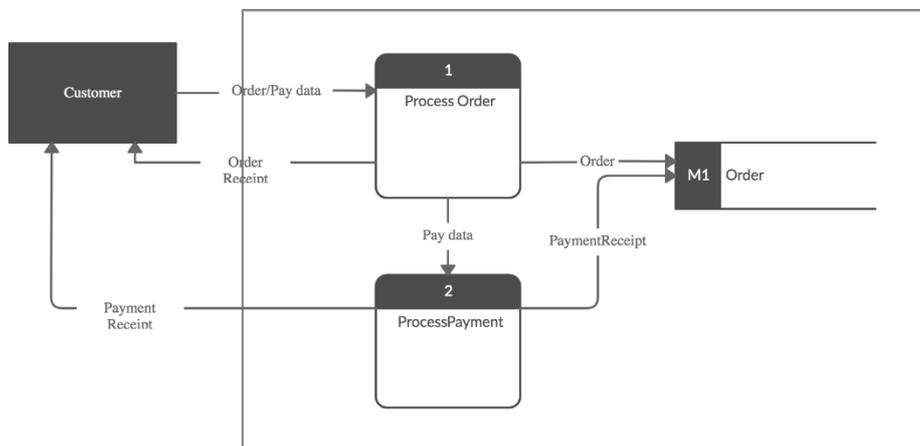
1 mark for Process Payment

1 mark for Manual Datastore

1 mark for suitable labels on each arrow

1 mark for inclusion of all inputs/outputs

1 mark for clarity/neatness of diagram



Total 8 Marks

Question 3

- a) Object-Oriented IS Methodology could potentially be used to analyse the system and represent the items in the existing *Express Espresso* Information System. 5

Identify FIVE (5) real-life objects from the coffee-shop section of the business which could be *candidate classes*

**Award 1 mark for each of the following objects;
Shop Manager/Barista/Customers/Suppliers/Order**

- b) For THREE (3) of the candidate classes above, list their attributes 6

**Award 1 mark for each suitable attribute.
MAXIMUM 2 marks if only attributes of one class given
MAXIMUM 4 marks if only attributes of two classes given**

Examples below (accept any suitable answers);

**Shop Manager (First_name, Last_name, Salary, Employee_ID...)
Barista (First_name, Last_name, Hourly_pay, Start_date, Employee_ID...)
Customer (First_name, Last_Name, Email_address, Phone_Number...)
Supplier (Company_Name, Supplier_ID, Phone_Number...)
Order (Order_ID, Order_date, Due_date...)**

Total 11 Marks

Question 4

- a) *Express Espresso* has had to adapt to significant challenges over the past year. 8

You are going to be investigating factors that could impact *Express Espresso* over the next few years. Using PEST analysis, identify likely factors for each category:

Award a mark for up to 2 examples from each category (up to total of 8) - see examples below (any valid and scenario related examples can be given a mark. If examples are not related to the scenario, a maximum of 4 marks to be awarded)

Political: (Possible further lockdowns – impact shop sales/Increase in tax = increased overheads/Trade deals – effect cost of raw ingredients)

Economic: (Likelihood of a recession may be high – increase in unemployment, less sales/Higher interest rates)

Social: (More employees working from home in future – bulk coffee increase in sale, but reduction in use of coffee shops/Possible health concerns over caffeine may result in less consumption)

Technological: (Possible for more admin staff to switch to working from home and reduce size of head office/Changes to current information system)

- b) Information will need to be gathered from senior and middle management, including the Managing Director, Shop Managers and Baristas, to carry out further PEST analysis.

Explain, with justification, which investigation method would be most suitable for each of these THREE types of employee.

Award 1 mark for a suitable method/employee type and 1 mark for an appropriate explanation for choice;

Interview most appropriate for MD/SMs (1) as it allows in-depth answers to questions and additional clarification

Observation most appropriate for SMs/Bs (1) as it's necessary to understand how the IS is used in normal practice (1)

Questionnaire most appropriate for Bs (1) as it enables responses from multiple employees across branches relatively quickly

Total 14 Marks

Question 5

- a) Currently, *Express Espresso* has employees working in different locations who have limited interaction with staff in other departments/locations. **3**

This makes it difficult to share knowledge across the company and has resulted in a lack of strong performance particularly in several of the coffee shops and in the warehouse as staff in these areas are not always kept informed of changes.

Explain THREE (3) ways in which the Information System could be improved to allow knowledge exchange within the company.

Award 1 mark for each suitable example (up to a total of 3) e.g;

Baristas in one store could pass on knowledge/experience to other stores via an intranet (1)

Reports generated for MD could be made available to Marketing employees (1)

A discussion forum could be made available via an intranet to enable communication between different departments (1)

- b) Identifying threats via SWOT analysis will help understand the company and its needs further. Discuss the **internal** and **external** threats that *Express Espresso* faces.

Award 1 mark for each suitable example (up to a total of 6). MAX 4 marks if only one category (internal/external) is discussed

Internal Threats: New system causes disruption in implementation/Employees may be unhappy with having to learn how to use a new system/development of new system coming in over budget/suppliers increasing costs

External Threats: Emerging competition (both online and other coffee shops in area)/Reduced in person customers due to covid restrictions etc/Possible increase in delivery costs/Change in customer habits – e.g. switching to lower caffeine products

Total 9 Marks

Question 6

- a) The Coffee Order Input Form is shown below. This form would be completed by a barista when taking face-to-face orders, administrative staff (when taking orders over the phone) and customers (when placing online orders). **14**

Evaluate the form and identify SEVEN (7) design problems.

For each issue explain how it could be improved.

You should take into consideration usability goals and the user experience.

Orders

The form contains the following elements:

- Name: [text input]
- Phone_Number: [text input]
- Email_Address: [text input]
- Quantity (in kg):
 - 1 kg
 - 3 kg
 - 5 kg
- Coffee type: [text input]
- Address: [text input]
- City: [text input]
- Postal code: [text input]
- [submit] [clear] buttons
- Please complete this form

Award 1 mark for each reasonable example of a design flaw, up to a total of 7

Award 1 mark for a reasonable explanation of how a design flaw could be improved, up to a total of 7.

Examples shown below (not a complete list, accept any reasonable answer)

Sequence of fields is not logical, the product fields are placed in between the collection of customer data. Could be improved by grouping customer details and product details separately.

No help option is provided. Customers may have questions relating to items like the Coffee type field etc and would need to go elsewhere to locate help. A clearly visible help feature would improve the experience.

User is only able to add one coffee type, but can choose multiple quantities, doesn't allow for requesting different coffee types in one order. Improve by adding option to select multiple coffee types and have drop down quantity boxes

Have to type in Coffee type, mistakes less likely with a drop-down box.

Add a drop down list so user can select from available options.

Too many fields to complete on one page/in one section – should be broken up into logical parts e.g., customer details/product details and displayed on separate pages.

Radio buttons should have been used instead of Checkboxes (assuming that only one quantity should have been selected. Replace with checkboxes to allow multiple items to be selected.

Having the clear button so close to the submit button makes it easier to make a mistake and press the wrong button causing frustration. Improve by using coloured buttons (green for submit, red for cancel)

Total 14 Marks

Question 7

- a) You are considering whether to use the Soft Systems Methodology, combined Multiview approach or the SSADM approach for analysing *Express Espresso's* current system. 6

Discuss the suitability of using the Multiview Approach in this case.

Award 1 mark for each reasonable example, up to a total of 5

Award MAX 4 marks if only positives OR negatives given

Award MAX 3 marks if no reference to scenario

Award 1 mark for a well-reasoned conclusion

Enables both human and technical considerations/Would allow user input from staff and customers/Helps to improve the work environment, as staff may be concerned about job security and changes in the IT system/More likely to end in a workable solution/Lacks the structure provided by a Hard system approach such as SSADM meaning steps may be missed/May be difficult to involve sufficient number of users (particularly customer)

- b) Draw a Rich Picture of *Express Espresso's* current system. 7

Award 1 mark for each reasonable example that shows correct understanding, up to a total of 7marks. For example to show:

- **Identification of staff**
- **Identification of customers**
- **Identification of suppliers**
- **Identification of information system**
- **Identification of personal data of customers/staff/suppliers**
- **Identification of coffee shops**
- **Identification of coffee products**
- **Identification of order processing (in person/phone/online)**
- **Identification of warehouse**
- **Identification of head office**
- **Identification of inefficiency**
- **Identification of issues**
- **Identification of cancellations/refunds**
- **Identification of staff perspectives**

Total 13 Marks

Question 8

- a) A Stakeholder Analysis Matrix is a useful tool in requirements capture. 5

Draw and label a stakeholder matrix for *Express Espresso*. Identify and position all the stakeholders in the matrix.

1 mark – Stakeholders are included on a correctly labelled matrix

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4 marks – Stakeholders are placed into correct section (1 mark for each section)

<p>High influence, low interest: Keep satisfied</p> <p>Owner</p>	<p>High influence, high interest: Manage closely</p> <p>Managing Director Shop Managers</p>
<p>Low influence, low interest: Monitor</p> <p>Payroll staff Finance staff Marketing staff Customer</p>	<p>Low influence, high interest: Keep informed</p> <p>Barista Administrative staff</p>

- b) The use of CATWOE helps to take users’ considerations into account. One of the aspects it focuses on is the Environment. 6

Discuss issues related to the Political, Ethical and Competitive factors found within the Environment aspect.

Award 1 mark for each relevant suitable example. Allow MAX of 5 marks if only two of the factors are discussed. MAX 4 marks if only one factor discussed.

Political: Future Government restrictions e.g., lockdowns, reduce face to face customers further - even greater importance on making eCommerce section a success/Potentially higher costs of trading due to lack of trade agreements in place

Ethical: A move towards a purely online existence would result in shops closing, staff being made unemployed, resulting impact on suppliers etc/Sourcing only ethically produced coffee beans would result in higher costs which would then have to be passed onto the customer

Competitive: Already significant no. of existing eCommerce coffee sellers, what would set them apart? /Difficulty in having to catch up with existing sellers. Are most of their eCommerce customers previously/currently face to face customers, would removing the shop front have an impact on the ecommerce sales. People have got used to making their own coffee at home...more demand

Total 11 Marks

Question 9

- a) An Enterprise Model can be either static or a dynamic form.

6

Explain the difference between the model types and recommend the most suitable method to use for analysing Express Espresso. You should justify your answer.

Award 1 mark for a description of a static model

Award 1 mark for a description of a dynamic model

Award 1 mark for recommendation of a dynamic model

Award up to 3 marks for justification of choice which relates to the scenario. e.g.

Express Espresso have already experienced a major change in terms of expanding into coffee beans sales as opposed to just selling coffee in a shop (1) It is having to make decisions as to whether it moves into sales of coffee beans and possibly closes coffee stores and how that will impact on the organization.

Total 6 Marks

Question 10

- a) Evaluate how useful a People-Oriented IS Methodology such as RAD or JAD would be in analysing the existing system.

6

Award up to 6 marks for suitable examples.

Award one mark for each basic correct point, 2 if it is explained well, 3 if it relates to the scenario. (Max 6 marks)

Would increase the input from users of the system including staff and customers. More likely to result in a system that meets user requirements as opposed to a purely technical based analysis approach. Allows the user to feel more involved in the process and consequently more likely to lead to satisfaction with the end result.

Time-consuming and can be difficult to organize to speak with staff. Some of the staff e.g. Baristas may not be able to define exactly what they want/explain their requirements. Too much focus on the interface aspect and insufficient detail about the actual processes-would require a hard system approach for that.

Total 6 Marks

End of paper

Learning Outcomes matrix

Question	Learning Outcomes assessed	Marker can differentiate between varying levels of achievement
1	1	Yes
2	1,3	Yes
3	3	Yes
4	4,5	Yes
5	5	Yes
6	6	Yes
7	1,2,3	Yes
8	2	Yes
9	3	Yes
10	3	Yes

Grade descriptors

Learning Outcome	Fail	Referral	Pass	Merit	Distinction
Understand soft and hard approaches to the analysis of information systems	Demonstrates basic ability to review the effectiveness and appropriateness of actions, methods and results.	Demonstrates limited ability to review the effectiveness and appropriateness of actions methods and results.	Demonstrates adequate ability to review the effectiveness and appropriateness of actions methods and results.	Demonstrates sound ability to review the effectiveness and appropriateness of actions methods and results.	Demonstrates comprehensive ability to review the effectiveness and appropriateness of actions methods and results.
Understand the techniques associated with requirements capture	Can basically identify, adapt and use appropriate skills, methods and procedures to reach basic solutions.	In a limited way, can identify, adapt and use appropriate skills, methods and procedures to reach limited solutions.	Can adequately identify, adapt and use appropriate skills, methods and procedures to reach appropriate solutions.	Can soundly identify, adapt and use appropriate skills, methods and procedures to reach supported and appropriate solutions.	Can coherently identify, adapt and use appropriate skills, methods and procedures to reach well supported and highly appropriate solutions.
Understand the different viewpoints associated with IS methodologies	Demonstrates basic ability to review the effectiveness and appropriateness of actions, methods and results.	Demonstrates limited ability to review the effectiveness and appropriateness of actions methods and results.	Demonstrates adequate ability to review the effectiveness and appropriateness of actions methods and results.	Demonstrates sound ability to review the effectiveness and appropriateness of actions methods and results.	Demonstrates comprehensive ability to review the effectiveness and appropriateness of actions methods and results.
Be able to apply various analytical techniques for understanding a complex	Can basically identify, adapt and use appropriate skills, methods and procedures	In a limited way, can identify, adapt and use appropriate skills, methods	Can adequately identify, adapt and use appropriate skills, methods and procedures	Can soundly identify, adapt and use appropriate skills, methods and procedures	Can coherently identify, adapt and use appropriate skills, methods and procedures

Marks

organisational environment	to reach basic solutions.	and procedures to reach limited solutions.	to reach appropriate solutions.	to reach supported and appropriate solutions.	to reach well supported and highly appropriate solutions.
Understand the relationship between the economic, social, political and technical factors influencing a business problem	Provides basic interpretation and evaluation of relevant information and ideas to address problems that are well defined but non-routine.	Provides limited interpretation and evaluation of relevant information and ideas to address problems that are well defined but non-routine.	Provides consistent interpretation and evaluation of relevant information and ideas to address problems that are well defined but non-routine.	Provides critical interpretation and evaluation of relevant information and ideas to address problems that are well defined but non-routine.	Provides consistently critical interpretation and evaluation of relevant information and ideas to address problems that are well defined but non-routine.
Understand and apply the principles of interface design and the requirements and characteristics of users that motivate these	Demonstrates basic ability to review the effectiveness and appropriateness of actions, methods and results.	Demonstrates limited ability to review the effectiveness and appropriateness of actions, methods and results.	Demonstrates adequate ability to review the effectiveness and appropriateness of actions, methods and results.	Demonstrates sound ability to review the effectiveness and appropriateness of actions, methods and results.	Demonstrates comprehensive ability to review the effectiveness and appropriateness of actions, methods and results.