Pearson Edexcel

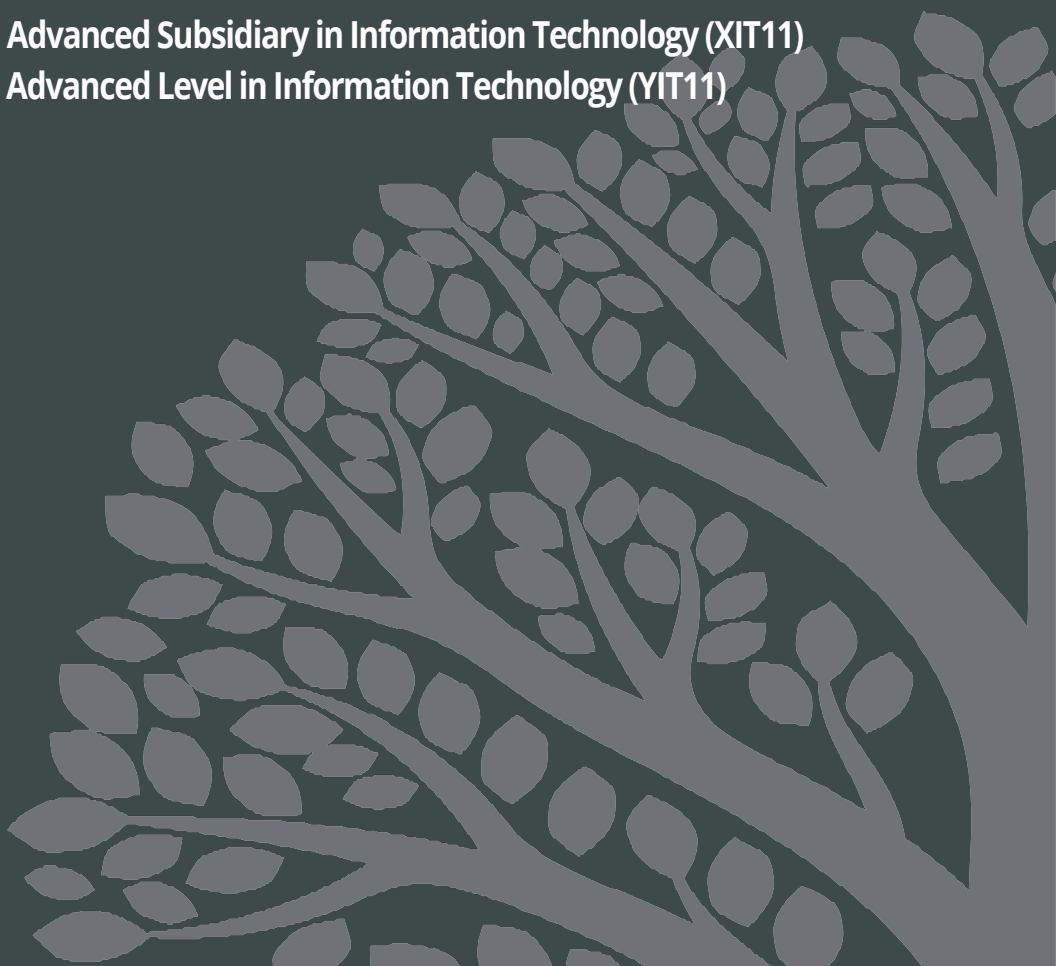
INTERNATIONAL ADVANCED LEVEL

INFORMATION TECHNOLOGY

Exemplars with examiner commentaries Unit 3 (WIT13)

Pre-first assessment materials based on additional SAMs

Pearson Edexcel International Advanced Subsidiary in Information Technology (XIT11)
Pearson Edexcel International Advanced Level in Information Technology (YIT11)



Introduction

1.1 About this booklet

This booklet has been produced to support teachers delivering Pearson Edexcel International Advanced Level in Information Technology specification. These exemplar materials will enable teachers to guide their students in the application of knowledge and skills required to successfully complete this course. The booklet uses questions from the additional Sample Assessment Materials (additional SAMs), showing example responses to questions and how examiners will apply mark schemes to demonstrate how student responses should be marked.

1.2 How to use this booklet

Additional Sample Assessment Materials have been used with exemplar responses, and each question contains:

- Question number and question in full
- Mark scheme for each question
- Exemplar responses for the selected questions
- Exemplification of the marker decision based on the additional SAMs mark scheme, accompanied by examiner commentary and guidance on how the answer can be improved where needed.

Centres should utilise the commentaries to support their internal assessment of students and embed exam skills into the delivery of the specification.

1.3 Further support

A range of materials is available to download from the Information Technology page of the Pearson website to support you in planning and delivering the new specifications.

Centres may find it beneficial to review this document in conjunction with: Additional Sample Assessment Materials, Getting Started Guide and Specification.

Command words shown in red are further explained in Appendix 6: Taxonomy, in the specification.

Question 1 uses this context.
Amala is working on an app to control Internet of Things (IoT) devices. The app will run on a smartphone and allow people to control their devices from anywhere with an internet connection.

1(a)

Amala wants the app to be secure.
She considers methods of encrypting the data sent to IoT devices.

Give two encryption types that Amala should consider.

Marks available: 2

Mark scheme

Question number	Answer	Additional guidance	Mark
1 (a)	Award **one** mark for each method. • symmetric encryption • asymmetric (public-key) encryption	Do not allow named encryption algorithms	2

Sample response 1

1. Symmetric encryption
2. Asymmetric encryption

Marks awarded: 2

Commentary 1

Candidate has achieved 2 marks for giving the two types of encryption.

Sample response 2

1. RSA encryption
2. AES encryption

Marks awarded: 0

Commentary 2

Although the candidate has given two named encryption algorithms, they have not given the types. The mark scheme additional guidance makes it clear that a named encryption algorithm will not be awarded.

1(b)	Many IoT devices use embedded systems. One advantage of using embedded systems is that they are cheaper than general purpose computers. **Explain two other** advantages of using embedded systems rather than general purpose computers in IoT devices. Marks available: 4

Mark scheme

Question number	Answer	Additional guidance	Mark
1 (b)	Award up to **two** marks for each linked explanation. Such as: • embedded systems are much smaller than general purpose computers (1) so they will fit into small objects/devices (1) • embedded systems do not have to 'boot up' from a storage device (1) so are faster loading/start up more quickly (1) • embedded systems use less resources than general purpose computers (1) so do not need connections to resources / can be smaller (1) • embedded systems use less power than general purpose computers (1) so can operate in battery powered/low powered situations (1) • embedded systems are much less complex than general purpose computers (1) so are easier to mass produce (1)	Must be a linked explanation to award two marks in each case.	4

Sample response 1

1. Embedded systems are much smaller than general purpose computers (1) so they will fit into small devices (1)
2. Embedded systems are much less complex than general purpose computers (1) so they are easier to make (1)

Marks awarded: 4

Commentary 1

The candidate has achieved 4 marks: 2 for knowing that embedded systems are smaller and less complex and 2 for the explanations (being able to fit into small devices and being easier to make).

Sample response 2

1. They're a lot smaller (1) so they're cheaper (0)
2. They can run on batteries (0)

Marks awarded: 1

Commentary 2

The mark is given for them being a lot smaller. The extension of being cheaper is not enough for a mark.
The second response could be an extension to an answer about embedded systems having lower power requirements, but it cannot get a mark by itself as many general purpose computers, e.g. laptops, can run on batteries.

1(c)	Amala wants her app to use speech recognition software. This will allow users to control IoT devices by talking to the app. One problem with speech recognition software is that it can be confused by background noise. The software will use machine learning. **Explain** how machine learning will help to overcome this problem. Marks available: 4

Mark scheme

Question number	Answer	Additional guidance	Mark
1 (c)	Award **one** mark for each point up to a maximum of **four** marks for a linked explanation. Answers may include: • learns noise types • to filter them out • learns human / voice characteristics / frequencies • to enhance them • so can ignore everything else • learns (characteristics of) key / command words • so can pick them out (of background) • so can ignore other words / speech • can improve/adapt over time / with more practice Example answers The software learns to separate out human speech (1) from background noise (1) and can enhance the voice signal to make it clearer (1). It would adapt over time (1) (to the environment it is in). The software learns background noise types (1) so that it can ignore them (1) allowing it to pick out human speech (1) and enhance it (1). With continual practice (1) the software will learn the characteristics of the human voice (1) and other noises (1) so that it can differentiate between speech and background noise (1).		4

Sample response 1

The software learns to separate speech from other noises and can improve the voice signal to make it clearer. The software will improve over time as it adapts to the sort of noises that it is exposed to.

Marks awarded: 4

Commentary 1

This is a good explanation that combines two aspects of machine learning: the ability to adapt with increased experience and the ability to pick out and enhance specific types of signal.

Sample response 2

Machine learning is about getting computers to perform a task without being specifically programmed to do it. In this case the computer will learn how to pick out someone's voice and ignore background noise.

Marks awarded: 2

Commentary 2

In this answer, the candidate has started with a generic definition of machine learning. Although correct, it does not answer the question.
The second sentence gains 2 marks for the linked explanation that a voice can be picked out from the background noise and that the background noise can then be ignored.

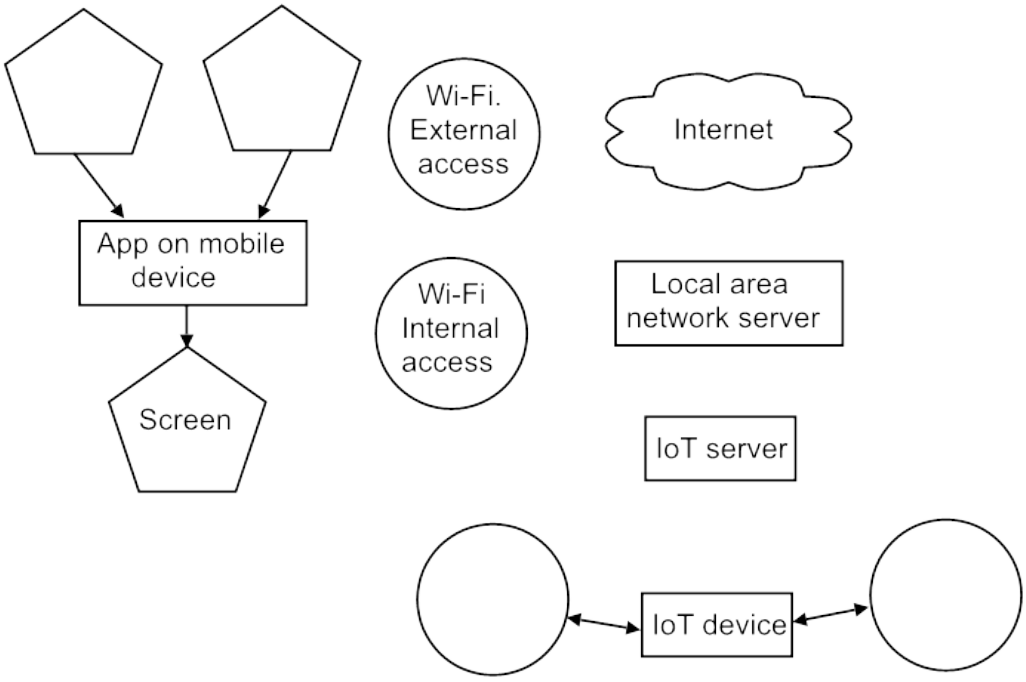
1(d)

Amala's app will control IoT devices on a home network.
She has developed a specification for this system.

The specification states that the system will:

- be controlled by a user speaking into a mobile device
- be controlled via a touchscreen on a mobile device
- connect a mobile device to an IoT device using a Wi-Fi internet connection
- use Bluetooth or Wi-Fi to connect from a local area network (home network) to IoT devices
- provide feedback from the IoT devices to a mobile device.

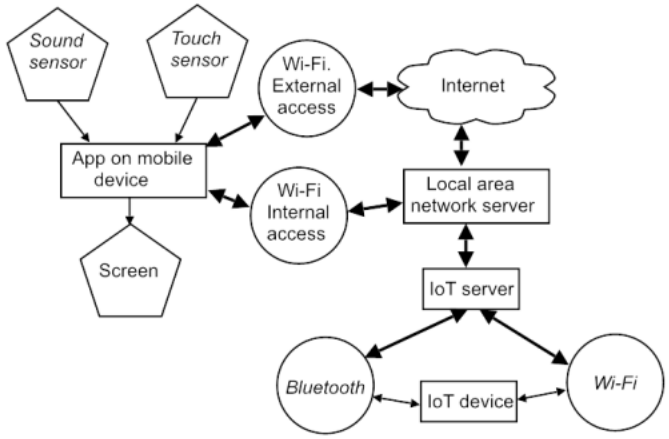
Here is Amala's partially completed high-level design for the system.
Complete this high-level design.



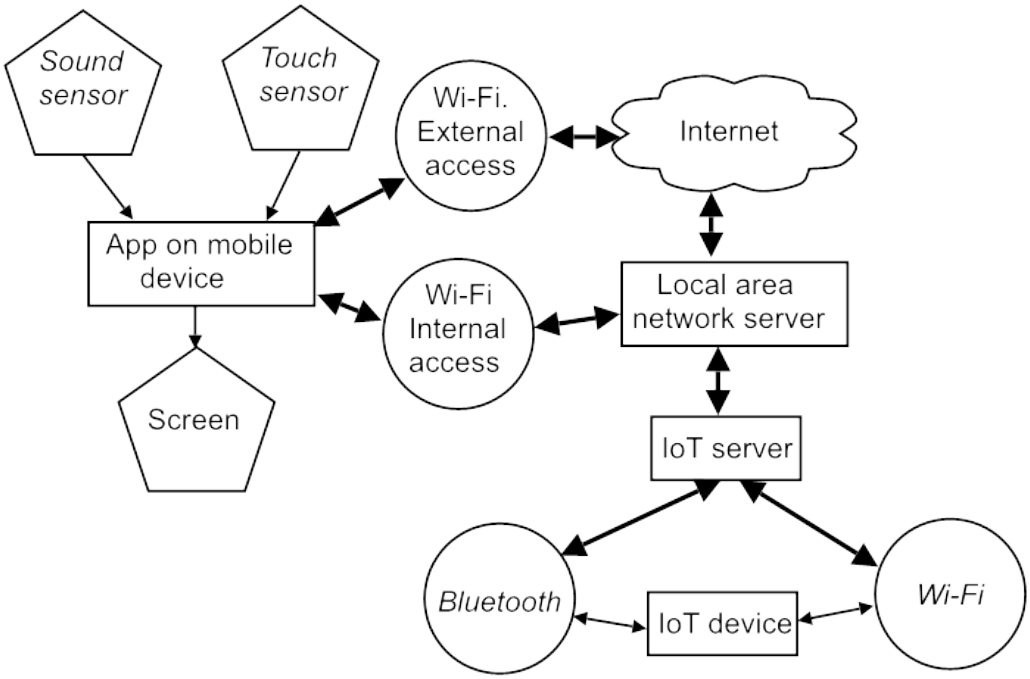
Key
Circle – Communication methods
Rectangle - Digital device
Pentagon – Input/output

Marks available: 6

Mark scheme

Question number	Answer	Mark
1 (d)	Award **one** mark each for: • sound sensor / microphone (1) • touch sensor / touchscreen (1) • Bluetooth (1) • Wi-Fi (1) • completing **all** links (ignore arrows) (1) • **all** arrows correct (1) 	6
	Total for question 1	**16**

Sample response 1



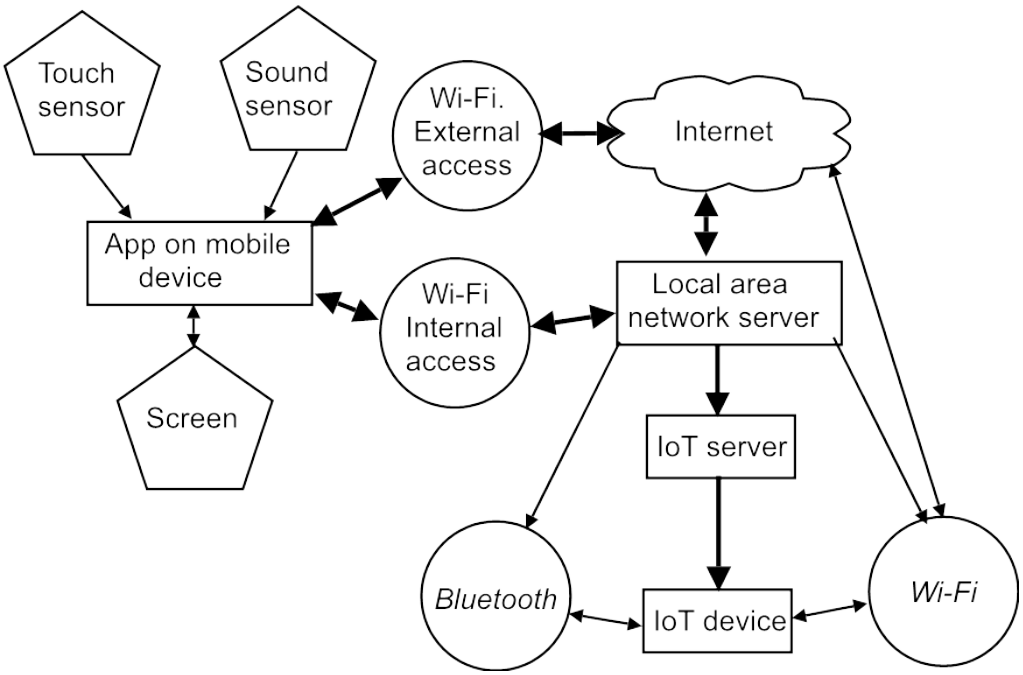
Marks awarded: 6

Commentary 1

The candidate has completed the diagram to show a system that meets all items in the specification. The diagram includes:

- **sound sensor**
- **touch sensor**
- **Bluetooth and WiFi links**
- **links between components, showing direction of information flow.**

Sample response 2



Marks awarded: 4

Commentary 2

The candidate has gained 4 marks for correctly labelled symbols for touch sensor, sound sensor, Bluetooth and Wi-Fi but has made mistakes with the connections and directional arrows.

Question 2 uses this context.
Statistics show that 80% of the companies that have a major loss of data go out of business within a month. Companies prepare for disasters, such as a major loss of data, by having a business continuity plan (BCP).

2(a) **Discuss** what should be considered when producing a BCP.

Marks available: 6

Sample response 1

A BCP should contain the information needed to recover a business when something goes wrong and keep the business going while the problem is fixed.
The BCP would need to include timescales, cost estimates and recovery options for a variety of scenarios such as:

- natural disasters like floods or earthquakes
- technical problems like power loss or communications failures
- deliberate attacks like cyber-attacks or robbery.

The plans should include both physical and digital aspects.
Physical aspects might be where to get extra staff, use of backup locations such as a hot site, and how to source and install new hardware at short notice.
Digital aspects might deal with how backups are made and stored, together with the procedures for getting them restored on either the old or a new system.

Marks awarded: 6

Mark scheme

Question number	Answer	Mark
2 (a)	BCP deals with 'what could go wrong' and identifies alternative ways of keeping essential / critical parts of the business going • deals with the physical aspects, e.g. loss of the IT centre • plans for extra staff / third party requirements for emergencies e.g. widespread illness, severe weather preventing staff movement • deals with digital aspects, e.g. data loss, communications loss • anticipates wide range of scenarios e.g. fire, flood, cyber attack, power loss • defines priorities for a range of possible events • sets timescales and objectives for recovery from a range of possible events • includes a disaster recovery plan dealing with restoration of services and operations, e.g. IT, communications, power	6

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a superficial and unbalanced discussion.
Level 2	3–4	• Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies. • Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.
Level 3	5–6	• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a balanced and fully developed discussion.

Commentary 1

This answer meets the descriptor for a level 3 answer.
The candidate has written a balanced account that shows a good understanding of the requirements of a BCP.
They have covered both physical and digital aspects and have given numerous examples of what they might involve.
There is nothing that would be regarded as out of place in a BCP and the candidate has set out the work in a coherent manner.

Sample response 2

When a business produces a Business Continuity Plan they should consider how a major loss of data would affect the business and what they can do to avoid the problem. Loss of data could mean that customers cannot be contacted or billed and this could lead to the business going bust.
A way to avoid the problem is to have a good backup system, with the data being copied and then stored in a safe place. Then if there is a major loss of data the backup can be restored and the business is able to carry on.

Marks awarded: 1

Commentary 2

This answer partly meets the descriptor for a level 1 answer.
The account is superficial and unbalanced. Much of the answer is a restatement of the question and the candidate only gives one consequence of data loss and one remedy.
The candidate does not give any examples of scenarios that might cause the loss of data.
A further consequence, remedy or example would be needed to reach the top of level 1.

2(b)	Companies use backup systems to protect business-critical data. When planning a backup system, a number of factors need to be considered. One factor is the amount of storage space that will be needed. **State six** other factors that should be considered when planning a backup system. Marks available: 3

Mark scheme

Question number	Answer	Additional guidance	Mark
2 (b)	Award **one** mark for 2 factors Award **two** marks for 4 factors Award **three** marks for 6 factors Answers may include: • backup medium • backup location • timings • which data / files need to be backed up • who is responsible for running backup / automation system • data transfer speed available • security of store • security of transfer • available hardware / cost of new hardware • method for testing the backups / system	Do **not** award a mark for how much data needs to be backed up / storage space needed.	**3**

Sample response 1

1. what the backup will be stored on
2. where it will be stored
3. which files need to be backed up
4. who is responsible for making the backup
5. security measures for the store
6. what backup hardware is available

Marks awarded: 3

Commentary 1

The candidate has given 6 correct factors.

Sample response 2

1. where it will be stored
2. when it will be done
3. how it will be made
4. which data has to saved
5. how much data needs to be saved
6. how much storage is available

Marks awarded: 1

Commentary 2

Two factors are required for 1 mark to be awarded.
The candidate gains a mark for points 1 and 2. Point 4 is also correct, but a further point would be needed for a second mark.
Points 5 and 6 are a restatement of the question and point 3 is too vague for credit.

2(c)

An insurance company intends to archive some of its data.
This is the task list for the archive project.

Archive task list. Approved May 20th.			
Task No.	**Task description**	**Date due**	**Notes**
1	Compile catalogue of existing data files	June 5th	Start May 25th
2	Get list of files to be archived from department heads	June 12th	Department heads need copy of catalogue
3	Allocate index and tracking numbers to files selected for archiving	June 15th	Start as soon as first department list is produced
4	Create templates for department heads to list files	June 5th	Start May 25th
5	Ensure there are sufficient DVDs to hold the archive	June 15th	Calculate number of items from department file lists
6	Digitise hard copy material	June 20th	Start as soon as first department list is produced
7	Copy archive material to DVDs	June 20th	Start as soon as first department list is produced

Create a Gantt chart in the boxed area for the tasks listed.
Your chart should indicate any dependencies.
Your chart should indicate any constraints.
You should assume that the company works seven days a week.

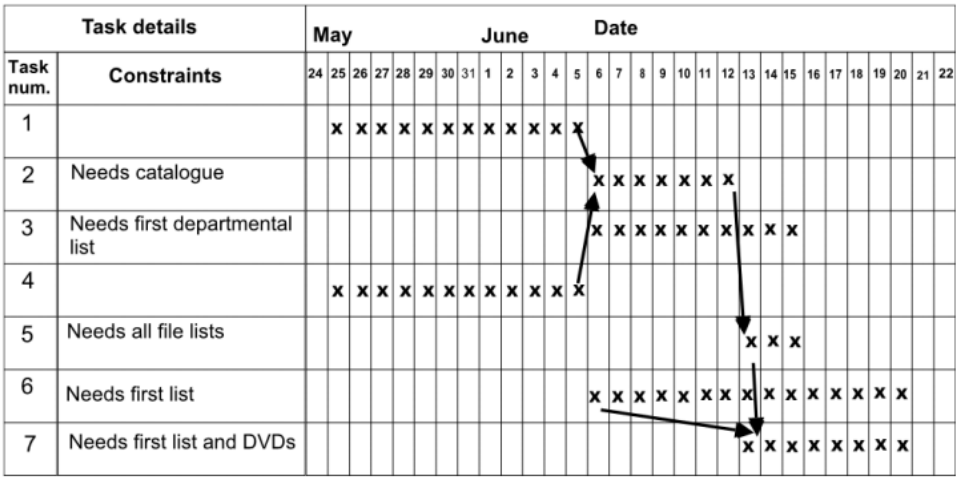
Note: Actual chart would be printed full page, landscape.

Task details		**Date**
Task num.	**Constraints**	
1		
2		
3		
4		
5		
6		
7		

Marks available: 6

Mark scheme

Question number	Answer	Mark
2 (c)	Gantt chart. Award **one** mark for: • dates / calendar • plausible time scales for all 7 tasks. Tasks 3 & 6 may start later than 6th June • at least two dependencies. May be start - start or finish - start • at least two constraints • four constraints • chart gives a clear overview of the project	6



Sample response 1

Task details		May June																													
Task num.	Constraints	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1			x	x	x	x	x	x	x	x	x	x	x	x																	
2	Catalogue required														x	x	x	x	x	x	x										
3	First department List required														x	x	x	x	x	x	x	x	x	x							
4			x	x	x	x	x	x	x	x	x	x	x	x																	
5	File lists required																					x	x	x							
6	First list required														x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
7	First list and DVDs required																					x	x	x	x	x	x	x	x		

Marks awarded: 6

Commentary 1

The candidate has completed the diagram to produce a chart that shows most of the required items. The chart gives a clear overview of the project, marking point 6, and includes:

- **dates and a plausible timescale - marking points 1 and 2**
- **four correct constraints - marking points 4 and 5. The constraint for task 4 is incorrect but only four are needed for the marks.**
- **three dependencies - marking point 3. The candidate has missed the dependencies from tasks 1 and 4, possibly thinking that dependencies must involve constraints. Two are enough for the mark.**

Sample response 2

Task details		Date																														
Task num.	Constraints		25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
1	None		x	x	x	x	x	x	x	x	x	x	x	x																		
2	Complete catalogue needed														x	x	x	x	x	x	x											
3	Needs first departmental list														x	x	x	x	x	x	x	x	x	x								
4	None		x	x	x	x	x	x	x	x	x	x	x	x																		
5	First file lists required																					x	x	x								
6	First list and DVDs required														x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
7	First list and DVDs required																					x	x	x	x	x	x	x	x			

Marks awarded: 3

Commentary 2

The candidate has completed the diagram to produce a chart that shows some of the required items.
The chart includes:

- **dates (1 mark) and a plausible timescale (1 mark). The months are missing but can be inferred from the day numbers. Marking points 1 and 2.**
- **Constraints: items 2, 3 and 7 are correct (1 mark) – marking point. A further constraint would be needed for a second mark - marking point 5.**
- **Dependencies have not been shown on the chart - marking point 3.**

The chart gives an incomplete overview of the project and there are too many missing or incorrect items to award marking point 6.

Question 3 uses this context.

Sarah is a website developer.

3 Sarah is a website developer.
A client has given her this brief for a new homepage for a website.

- Page size 2560 pixels wide, 1440 pixels high.
- Title 'gifimalations.com' in pale green with red shadow.
- Title changes from pale green with red to purple with blue shadow.
- Navigation bar top right.
- Colourful, animated GIFs of animals, two rows of five.
- GIFs run when page loads.
- Clicking a GIF expands it to run in a pop-up window.
- Music plays when the page loads, using file 'catchy_tune.wav'.
- Bee moves continuously to and fro along the arrow track.
- Catching and clicking the bee makes the music louder or quieter, louder to right of page.

Figure 1 shows a sketch of the required screen for the home page.

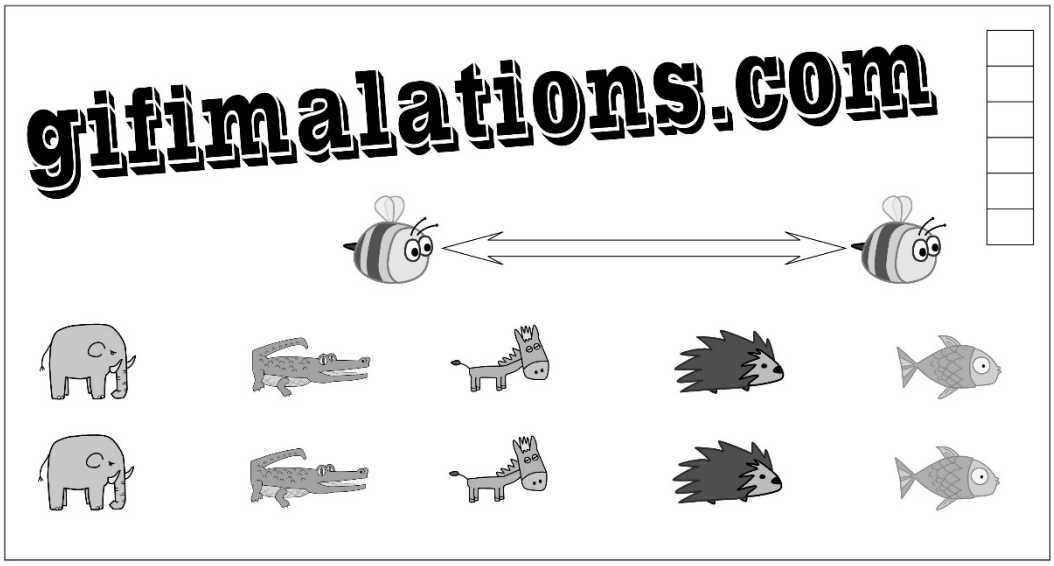


Figure 1

If Sarah were to implement this design there would be a number of ergonomic and accessibility issues relating to the page.

Evaluate these issues and their possible solutions.

Marks available: 12

Mark scheme

Question number	Indicative content	Mark
3	Responses should be in the context of the web page as evidenced in the image and brief. Problems • page size, too wide to view on standard monitor/screen without scrolling • navigation bar, not visible without sideways scroll or viewing screen at 50% or less • cycling colours on title, distracting and annoying • 10 GIFs run on page load, slowing load time, distracting and annoying • GIFS and title are overuse of colour and movement (too much on one screen) • popups can be annoying and may not work correctly, many browsers have anti-popup settings • method of changing the music is likely to cause accessibility problems. Also more unwanted movement on the screen causing distraction • there does not seem to be any way of muting the music • over busy screen, too much happening at once Solutions • Page size o consider target device o have active pages that change width o use page size that is small enough / sized for most common devices • Navigation bar o place bar top left or top of page o have bar in floating panel that is always visible • Colours o avoid having too many colours, recommended maximum is 4 per page for non-image material o avoid flashing / cycling colours. These are attention seeking techniques and should only be used for one, important item per page o avoid having too great/small an intensity range • Page loading o takes too long if everything loads at once, consider using static thumbnails for GIFs and only load them on-click • Music o do not use the animated bee as a default method for controlling the music. Users with motor control problems may not be able to use it. o provide a method for stopping the music	12
	• GIFs o do not load them all when page loads, use static images or icons o run GIFs within the page to prevent popups, or alert the user that the GIFs will require a popup o ensure GIFs return to static image / icon when they have finished running • Screen too busy o mainly covered by previous items Conclusion. • Comparison of solutions / suggest best solutions	

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–4	• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a response that lacks development. • Demonstrates limited awareness of competing arguments. • Conclusion, if present, is generic or unsupported.
Level 2	5–8	• Demonstrates knowledge and understanding, which is mostly relevant and may include some inaccuracies. • Applies understanding to make some coherent connections and a partially developed response. • Demonstrates some awareness of competing arguments, but this may be unbalanced, and partially supports conclusion with evidence.
Level 3	9–12	• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a fully developed response. • Demonstrates an awareness of competing arguments and supports conclusion with evidence.
		Total for question 3 **12**

Sample response 1

Several problems may be identified with the design. The most serious ones are:

- Page size
- The number of GIFs
- The moving Bee
- Page size.

The resolution of 2560 is QHD and not many screens allow that, especially on mobile devices like smartphones. This means that users will have to scroll sideways to see all the page. This can cause unwanted strain on hands and wrists and can also be awkward for people with mobility problems.
A better specification would be to use a more common page size such as HD, 1280 px, or to make the pages active so that they adjust to the device being used.
Active pages are better but need more complex coding and Sarah may not be able to get it right.
The GIFs.
Having GIFs run when the page loads slows the process down, this can be a problem when users have limited bandwidth. The main problem though is that having all the GIFs playing makes the page too busy as this can be distracting and difficult for people with visual problems to cope with.
A better specification would be to have the GIFs run on demand. They could be loaded as still pictures and then run when clicked. Users could be given the option of looping.
Alternatively, the GIFs could load in the background and then only play one at a time. That would cut down processing load and also be less distracting.
The run on demand idea is probably best as the GIFs could then be loaded when required, cutting down on data usage.
In either case, the GIFs shouldn't run as popups as this can be very annoying.
The moving bee.
This makes it very difficult for users to adjust the volume. Normal users may get hand or wrist strain trying to catch the bee, depending on its speed. People with poor vision or limited mobility may be unable to use the control at all.
A better specification would be to have the bee as an icon that can be moved once selected. It could still control the volume with its position but would be much easier to use.

Marks awarded: 12

Commentary 1

This answer meets the descriptor for a level 3 answer.
The candidate correctly identifies three issues and explains why they cause both ergonomic and accessibility problems.
The candidate gives alternative solutions to two of the issues and comes to a supported conclusion about which alternatives are best.

Sample response 2

There are a lot of things wrong with the page. It's too busy and distracting having all the GIFs and the bee moving around.
All the movement could affect people with concentration problems and stop them from being able to use the page.

The colours are bad as well. Having green and red in the title makes it difficult for colour blind people to read. Sarah should tell her client to use something like blue instead of green.

Having music load with the page slows things down and users won't be able to adjust it until the bee loads. This may annoy users so that they click off the page. This would lose page views making the page less effective.
Sarah should tell her client not to load the music until after the page is displayed. that will mean that the visitor will have time to look at the page before dealing with the music

Marks awarded: 3

Commentary 2

This answer meets the descriptor for a level 1 answer.
The candidate shows some limited understanding, e.g. colour-blindness and pages being too distracting, but does not develop either of these beyond saying that they should be changed.
No ergonomic issues have been identified and there is no conclusion.

Question 4 uses this context.
Talitha runs a small online business, selling clothing. At present she keeps her product information in a spreadsheet.

4(a)

Figure 2 shows an extract from the spreadsheet.

Product name	Product ID	Manufacturer	Manufacturer ID	Colour	Size	Gender
K-Mex T shirt	2322	Indieshirts	3	Green	S,M,L,XL	F,M
K-Mex T shirt	2324	Indieshirts	3	Blue	S,M,L,XL	F,M
K-Mex T shirt	2325	Indieshirts	3	Red	S,M,L	F,M
Oahu cargo shorts	1323	Legwares	5	Stone	26,28,32,34,36	M
Oahu cargo shorts	1325	Legwares	5	Hot lava	30,32,34,36,40	M
Fern sarong wrap	1754	Superbeach	2	Red, Blue	Fits all sizes	F
Flower sarong wrap	1755	Superbeach	2	Gold, Purple	Fits all sizes	F
Fruit sarong wrap	1756	Superbeach	2	Black, Silver	Fits all sizes	F

Figure 2

Talitha wants to sell a wider range clothing. She has been advised that she should store the product information in a database instead of a spreadsheet.
You must develop a normalised database solution for Talitha.

(a) **Create** tables showing the database in third normal form.
Identify all primary keys (single attribute or composite) and foreign keys.
You do not need to include any data in the tables.

Marks available: 12

Mark scheme

Question number	Answer	Mark
4(a)	Award **one** mark for: • Product table • Manufacturer table • Product_detail table • Size table • Colour table • Gender table • Indication of primary keys (Product, Manufacturer) • Indication of primary keys (Size, Colour, Gender) • Indication of foreign key (Manufacturer_ID in Product) • Indication of composite key in Product_detail (or equivalent) • Indication of foreign keys in Product_detail (or equivalent table) • Fully normalised. Product Product_ID | Product_name | Manufacturer_ID * Manufacturer Manufacturer_ID | Manufacturer Product_detail Product_ID * | Size_ID * | Colour_ID * | Gender_ID * Size Size_ID | Size Colour Colour_ID | Colour Gender Gender_ID | Gender **Alternative answer using parenthetical format** Product(ProductID, ProductName, ManufacturerID*) Manufacturer(ManufacturerID, ManufacturerName) Colour(ColourID, ColourName) Size(SizeID, SizeDescription) Gender(GenderID, GenderDescription) Garment(GarmentID, ProductID*, ManufacturerID*, ColourID*, SizeID*, GenderID*)	12

Sample response 1

Product

Product_ID	Product_name	Manufacturer_ID *

Manufacturer

Manufacturer_ID	Manufacturer

Product_detail

Product_ID	Size_ID	Colour_ID	Gender_ID	Manufacturer_ID

Size

Size_ID	Size

Colour

Colour_ID	Colour

Gender

Gender_ID	Gender

Marks awarded: 9

Commentary 1

The candidate has created a set of tables that partly meet the requirements of the question.
There are 6 tables with appropriate names - 6 marks out of 6.
All five Primary keys are identified - 2 marks.
Only one foreign key is identified and there is no composite key in Product_detail1 - mark out of 2.
The tables are not fully normalised.

Sample response 2

Product

Product_ID	Product_name	Manufacturer	Gender

Manufacturer

Manufacturer_ID	

Product_information

Product_ID *	Size_ID	Colour_ID

Size

Size_ID	Size

Colour

Colour_ID	Colour

Marks awarded: 7

Commentary 2

The candidate has created a set of tables that partly meets the requirements of the question.
There are 5 tables with appropriate names - 5 marks out of 6. The sixth table should have been 'Gender'.
Four primary keys are identified - 1 mark, and one foreign key is shown - 1 mark.
The tables are not fully normalised and there is no composite key in Product information.

4(b)	Talitha has a store of historical sales data. She considers using predictive data analytics on her sales. **Explain two** ways in which she could use predictive data analytics. Marks available: 4

Mark scheme

Question number	Answer	Additional guidance	Mark
4(b)	Award up to **two** marks for each of **two** linked explanations. Explanations may include: • to identify customers that are likely to purchase a product/specified item of clothing (1) so that they can be given incentives (to buy matching items/accessories) (1) • to predict peak demand periods / fluctuations in demand (times of the year)(1) to improve stock control/customer service (1) • to predict changes to purchasing patterns (changes in popularity/fashion)(1) so that stock levels can be adjusted (1) • to predict demand for goods, so that just in time stock control can be practised (1) resulting in less cash being tied up in stock (1)		4

Sample response 1

1. Talitha can predict peak demand periods. This will help improve her stock control.
2. She can also identify customers that are likely to purchase a part of a product range so that they can be given special offers to get them to purchase more.

Marks awarded: 4

Commentary 1

The candidate has achieved 4 marks.
Answer 1 gets 1 mark for knowing that predictive analytics can identify peak demand, and 1 mark for the expansion of improved stock control.
Answer 2 gets I mark for knowing that predictive analytics can identify potential customers, and 1 mark for the expansion of being able to offer targeted incentives.

Sample response 2

1. She can see customers spending history and predict what they might like to buy in the future.
2. She can work out when she needs to order more stock.

Marks awarded: 1

Commentary 2

The candidate scores one mark in answer 1 for predicting future purchases.
They have not written enough in answer 2. There would need to be something about changes in patterns or demand to get a mark.

Question 5 uses this context.

A holiday company wants to develop a new website for selling package holidays online.

The IT staff decide to use the waterfall method of project management

5(a) **Explain one** strength of the waterfall method.

Marks available: 3

Mark scheme

Question number	Answer	Mark
5(a)	Award **one** mark for each point up to a maximum of **three** marks for a linked explanation. Such as: • has a clear structure / defined steps (1) each step must be completed before moving on (1) so problems have to be dealt with / cannot be pushed aside for later (1) • has an end goal from the start (1) so team has a focus from the start (1) so are less likely to deviate/be sidetracked (1) • methodical with good documentation of information/data/project details between steps (1) enabling/allowing team/personnel changes between steps (1) without needing people to redo/review/experience previous steps (1)	3

Sample response 1

The waterfall method has a well-defined structure. Each stage must be completed before moving on to the next. That means that everything in that stage must be dealt with at the time and things don't get done out of order.

Marks awarded: 3

Commentary 1

This is a good explanation that combines three relevant points, shown underlined, in a logical way.

Sample response 2

The waterfall method is a series of 7 steps which means the IT staff have a pre-made structure to use and they will know what to do when.

Marks awarded: 1

Commentary 2

The candidate has identified that the waterfall method has a defined structure but has not expanded this enough to get more than one mark.

5(b)	The IT team has to produce a specification document as part of stage one of the waterfall method. **Discuss** what the IT team needs to do in order to produce this document. Marks available: 6

Mark scheme

Question number	Indicative content	Mark
5(b)	Responses should be in the context of the waterfall project management technique being used for developing a specification document for a website. • this is Stage 1 of the Waterfall method, requirements, • stakeholders; people who will run and/or maintain the website, people commissioning the website, potential users / customers • methodologies; interviews, briefing documents, focus groups, investigating similar sites • getting details / requirements of the required website (what it will do) • constraints; financial, time, personnel • analysing requirements • resolving conflicts of requirements • finding system requirements, min and recommended system to work on the project. • design the specification document	6

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a superficial and unbalanced discussion.
Level 2	3–4	• Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies. • Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.
Level 3	5–6	• Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a balanced and fully developed discussion.

Sample response 1

The first stage of the waterfall method is called 'requirement' and producing a specification document would be part of that.

The IT team can use several methods to obtain the information they need. These may include verbal methods, interviews and focus groups, and documentary methods, looking at design briefs, documents from similar websites and requests from the different people who have an interest in the project.

The team will need to get information from the people who will have to run and maintain the website as well as from those who will be paying for it and potential users.

The team will have to analyse all the different needs and produce something which sorts out any conflicts between those needs. They may have to go back to people and work out compromises. This may involve things like money available and time needed.

Finally, they can design and write the document. this will have the final version of the specification which must be kept to for the rest of the stages.

Marks awarded: 5

Commentary 1

This answer partly meets the descriptor for a level 3 answer.

The candidate correctly identifies methods of obtaining the information required and who some of the stakeholders would be.
They discuss some of the problems that must be solved, identifying constraints and the need to negotiate around conflicts in order to produce the final document. The discussion would need more development to get the sixth mark.

Sample response 2

In order to produce the document, the IT team must collect all the information that they can about the project.

They will need to get information from the website designers and from the holiday company. They could interview the person who asked for the website and get a written specification from the holiday company.

The team will have to look at everything they collect and then work out all the requirements and constraints. Then they can produce a document that takes all this into account and gives a guide for how to progress with the project.

Marks awarded: 2

Commentary 2

This answer meets the descriptor for a level 1 answer.
The candidate shows some limited understanding, e.g. need to obtain information and analysis of what is collected but does not develop either of these.
The candidate has not understood that the IT staff and website designers are all part of the holiday company.
The answer is limited but accurate as far as it goes and therefore is placed at the top of level 1.

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