# GCSE Computer Science BTEC Tech Award DIT

Mr Elsley

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Course content (GCSE Computing)

- This GCSE has a strong focus on how computers work rather than how computers are used.
- Students learn about the "hardware" inside computers in terms of what the parts are and how they inter-connect
- Students learn about how computers store, process and transfer information.
- Students design algorithms, write text-based computer programs
- Maths – students learn, and become proficient with, new number systems.

Computing

ICT

How computers work

How computers are used
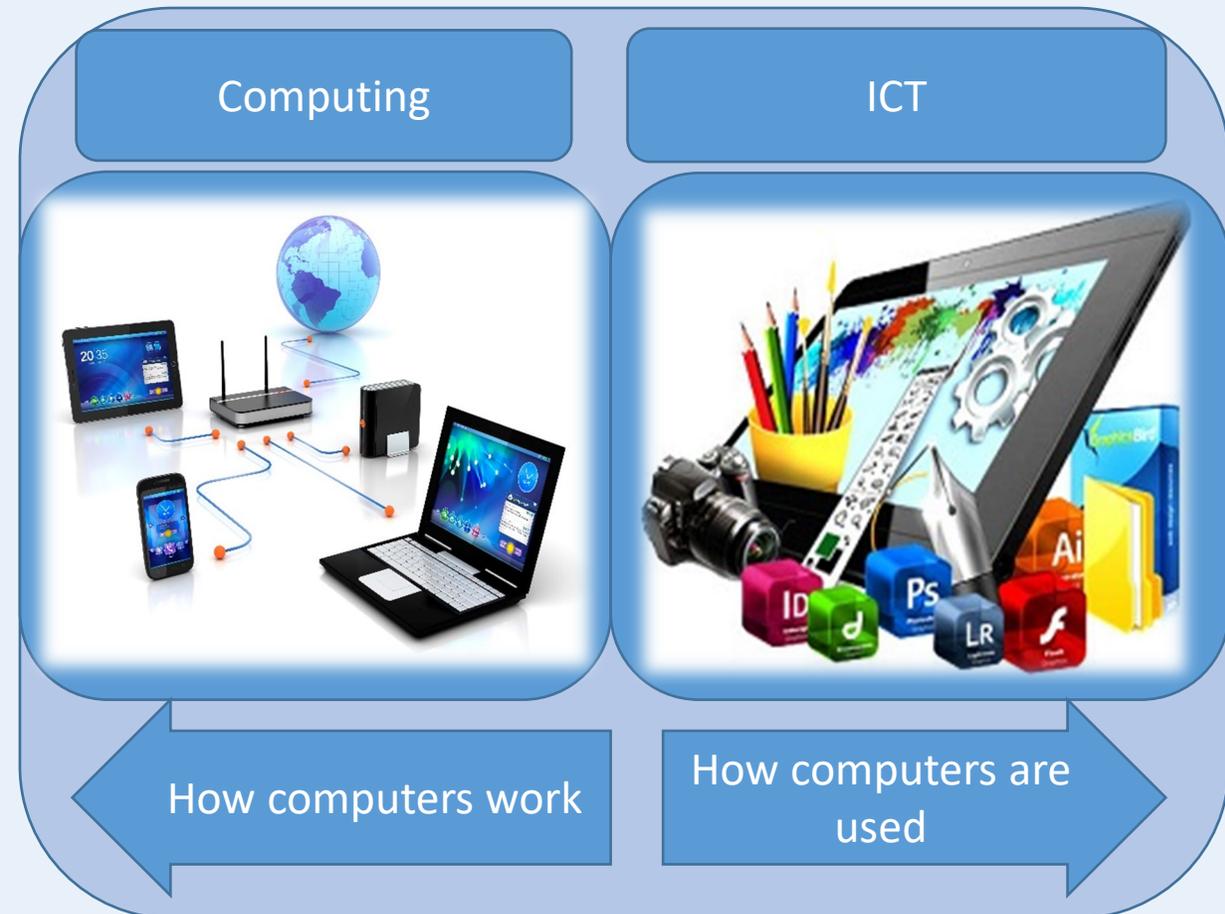
Example lesson "Key Questions"

- How is data transferred over a network using packet switching and protocols?

- What's the difference between peer-to-peer networks, client-server networks and virtual networks? What are the advantages and disadvantages of each?

- Why do we have a Data Protection Act if we then have exemptions to it?

- Is it ok to "lose" some data when I compress it to make space?

Assessment

Exam – Computer Systems

- Hardware components
- Software types
- Networks
- Legal, cultural and ethical issues
- Binary & Hexadecimal
- Music & video compression
- Character sets

Exam – Computational Thinking

- Algorithms, flow diagrams and pseudocode
- Programming techniques
- Handling, sorting and selecting data
- Binary and Hexadecimal number systems
- Storing and transferring data

Exam format: Exams are both paper-based and are sat at the end of year 11. Both exams are 90 minutes and make up 50% of the final grade

Compulsory Programming Task

- Students need to have 20 hours of programming experience using a text based language.

- We design, make, then test a series of programs using "Python"
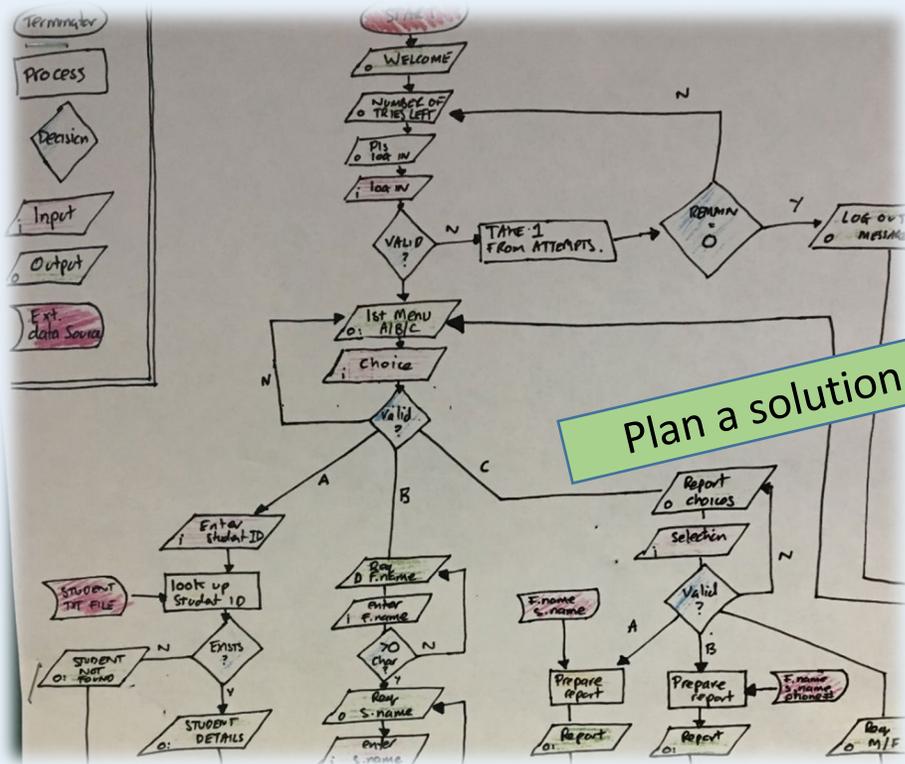
Plan a solution, then code it

```
File  Edit  Format  Run  Options  Window  Help
# log in
def start():
    password="password1" # password will be "password1"
    print ("Welcome to the student admin program \n")
    attempts=0 #set a variable that will increment by one every time p/w
    while attempts<3:
        print("please enter your password.\nYou have",3-attempts,"tries re
        login=input()
        if password==login:
            print("Log in successful\n\n")
            attempts=3
        else:
            print("Password incorrect.")
            attempts=attempts+1
            if attempts==3:
                quit()

#first menu.  This is where we can choose what to do.
def mainmenu():
    options=["a","b","c"]
    choice=""
    while choice not in options:
        print ("You can now choose which action you wish to carry out.\nP:
        choice=input()
        choice=choice.lower()
    return choice

#a select
#Depending
def selectionmade(x):
```

This activity is currently being reviewed by all exam boards

Example exam questions

2 (a) Order the following units from smallest to largest:

GB   bit   PB   byte   nibble   MB

....

[1]

(b) Convert the decimal number 191 into an 8 bit binary number.

....

[1]

(c) Convert the hexadecimal number 3E into a decimal number. You must show your working.

....

(d) There is a subroutine, HEX(), that takes a denary number between 10 and 15 and returns the corresponding hexadecimal number. E.g. HEX(10) would return "A", HEX(15) would return "F".

Write an algorithm, using the subroutine HEX(), to convert any whole decimal number between 0 and 255 into a 2 digit hexadecimal number.

Difficulty

1 Ann wants to purchase a new computer and is looking at two models. The specification of the CPU in each computer is shown in **Fig. 1**.

Fig. 1

Computer 1	Computer 2
Clock Speed: 1 GHz	Clock Speed: 1.4 GHz
Cache size: 2 MB	Cache size: 2 MB
Number of Cores: 4	Number of Cores: 2

(a) When running a 3D flight simulator, Computer 1 is likely to run faster than Computer 2.

Using the information in **Fig. 1**, identify **one** reason for this.

9 * Even though the computer devices they own still work, people often want to buy the most up-to date models, such as the latest smartphone.

Discuss the impact of people wanting to upgrade to the latest smartphone.

In your answer you might consider the impact on:

- stakeholders
- technology
- ethical issues
- environmental issues

Requirements for the course

- No subject level requirements for this course, but important to note that maths is a major part of both exam units.
- Students who achieve well on this course are likely to have enjoyed the following units of work at Key Stage 3:
  - Binary
  - Python Programming **
  - Technology inside the computer
- More "skills" based:
  - Problem solving
  - Analysis
  - Ability to pay attention to detail!
- This course **can** be taken with the BTEC Technical Award in Digital IT

BTEC Technical award in Digital Information Technology (BTEC DIT)

How it is assessed

Component 1

Principles of User Interfaces

- The theory of user interfaces (factors affecting design, design principles)
- Project Management Tools (Critical Path, Gantt)
- Creating a User Interface
- Feedback and Improvements

Internally Assessed

Component 2

Collecting, Presenting and Interpreting Data

- The impact of data on companies/individuals
- Creating a dashboard
- Drawing conclusions and review

Internally Assessed

60%

Component 3

1.5 Hour Exam

Externally Assessed

"Effective Digital Working Practices"

40%

Timescales

Year 10

Sept — Easter — July

| Component 2 | Component 1 |

Year 11

Sept — Xmas — May

| Component 1 | Component 3 |

User Requirements
Audience and Purpose
Accessibility Considerations
Easy of use features

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F	M T W T F
Website design												
research												
project proposal												
create init ial design												
story board												
Development stage												
prototyping												
client feed back												
improvements												
Review stage												
user testing												
polishing-launch												
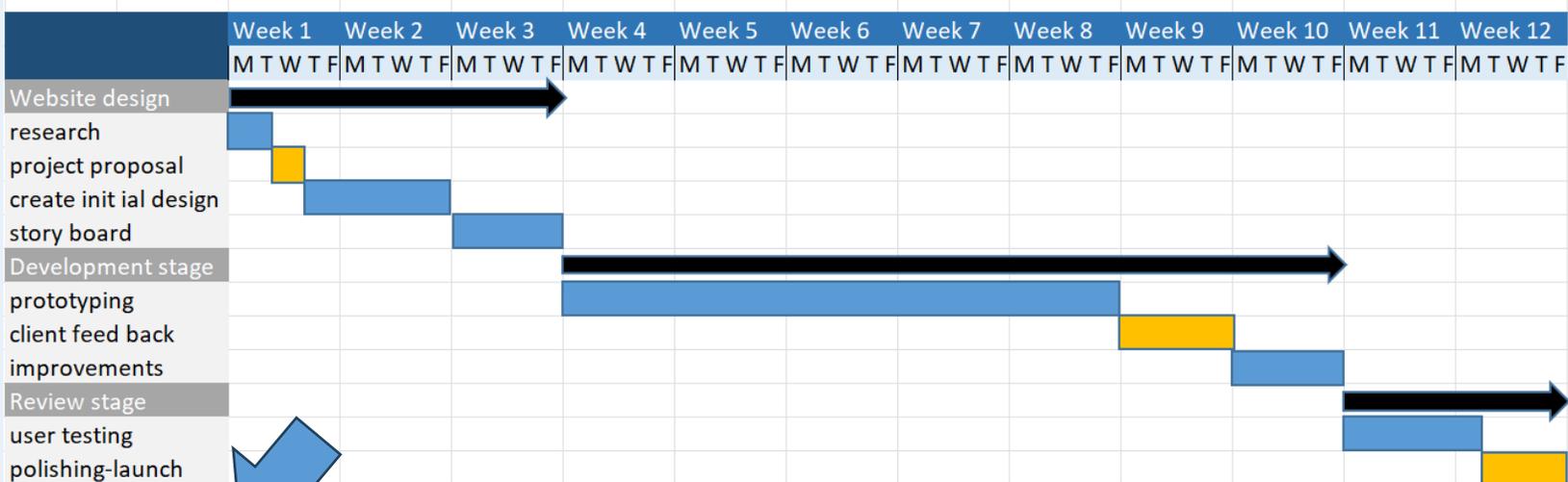
Background image, different for homepage

Dyslexie, size 36
facilities
text2speech

Dyslexie, size 36
lessons
text2speech

Dyslexie, size 28
Ski Simulator
text2speech

Dyslexie, size 36
Settings
text2speech

Berlin sans FB demi, size 66

WELCOME TO THE SKI ARENA

Colour blind mode

icon

socials

icon   icon

All buttons hyperlinked

facilities
lessons
Ski simulator
settings

Welcome to the Ski Arena

Product Lifecycle- Analyse, Plan, Design, Implement and Review

Component 1
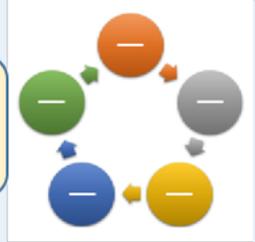
Strengths, Weaknesses, Improvements

Component 2

You will need to know:

- Difference between Data and Information
- Importing data into Excel
- Formulae
- Cell Referencing (relative/absolute)
- Naming Ranges
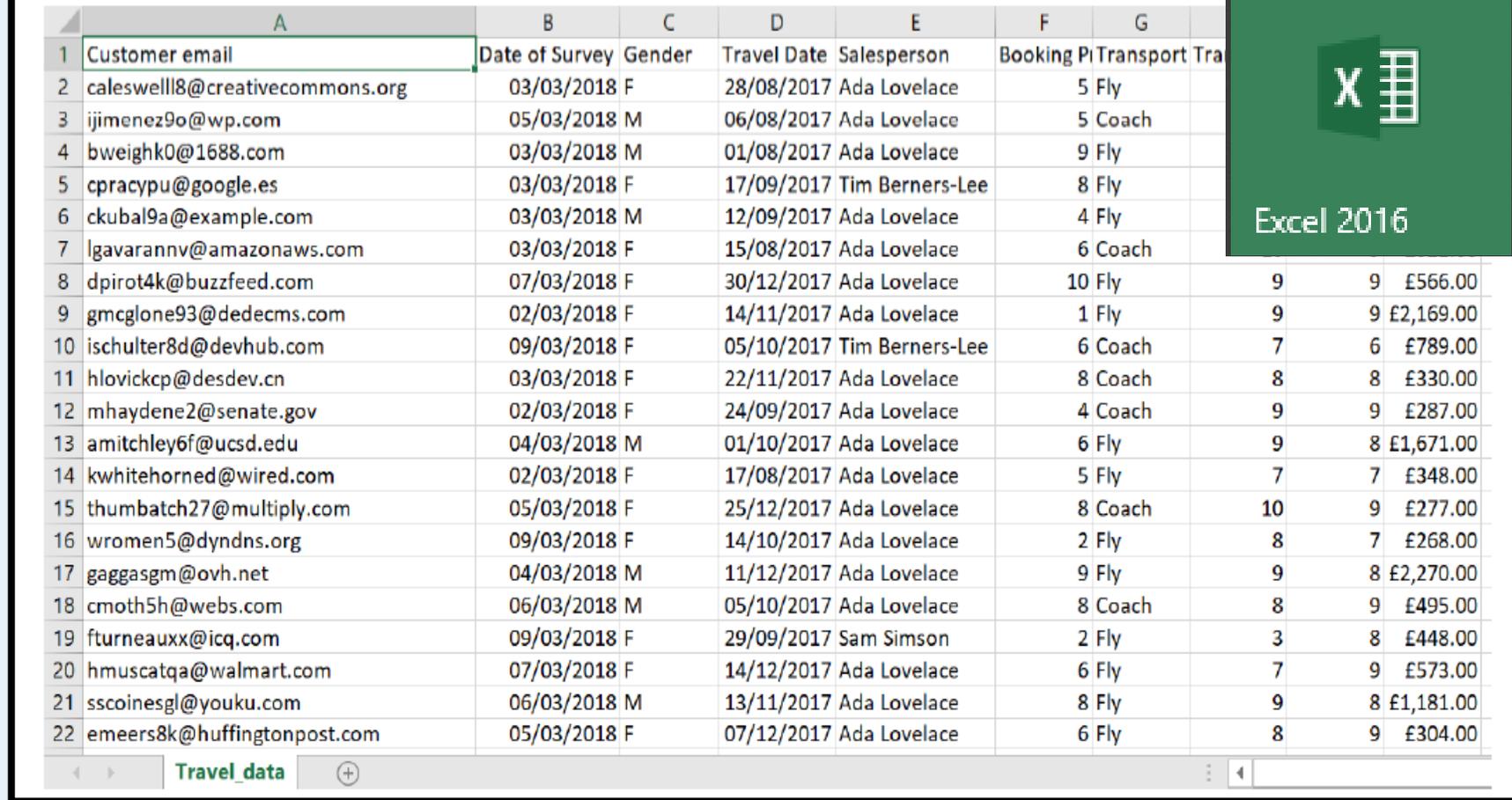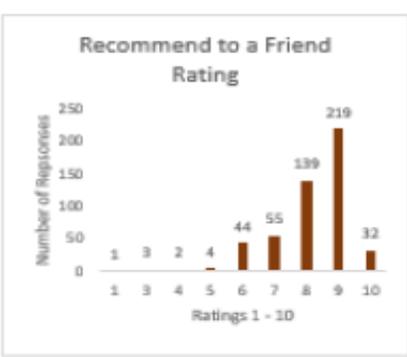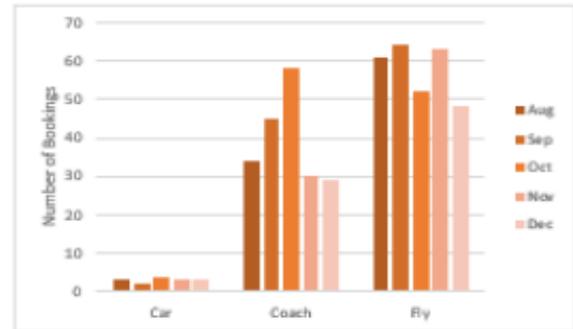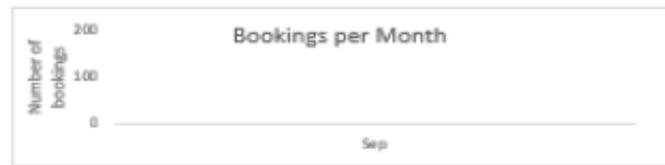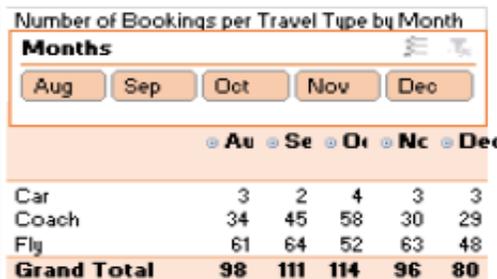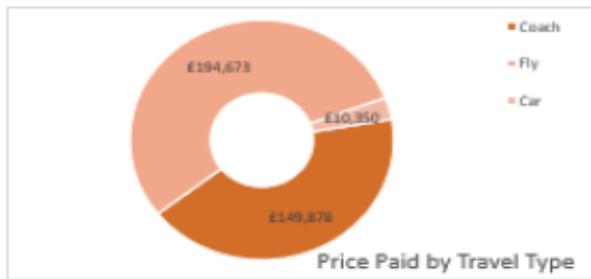- Data Analysis
  - IF
  - SUMIF
  - VLOOKUP
  - COUNT/COUNTIF

- Logic (AND OR NOT)
- Sorting
- Filters
- Macros
- Data Validation
- Linking Worksheets

- Freezing Panes
- Conditional Formatting
- Graphs
- Form Controls (Drop Downs, Spinners,etc..)
- Pivot Tables (Dist)

Excel 2016

	A	B	C	D	E	F	G			
1	Customer email	Date of Survey	Gender	Travel Date	Salesperson	Booking P	Transport	Tra		
2	caleswelll8@creativecommons.org	03/03/2018	F	28/08/2017	Ada Lovelace	5	Fly			
3	ijimenez9o@wp.com	05/03/2018	M	06/08/2017	Ada Lovelace	5	Coach			
4	bweighk0@1688.com	03/03/2018	M	01/08/2017	Ada Lovelace	9	Fly			
5	cpracypu@google.es	03/03/2018	F	17/09/2017	Tim Berners-Lee	8	Fly			
6	ckubal9a@example.com	03/03/2018	M	12/09/2017	Ada Lovelace	4	Fly			
7	lgavarannv@amazonaws.com	03/03/2018	F	15/08/2017	Ada Lovelace	6	Coach			
8	dpirot4k@buzzfeed.com	07/03/2018	F	30/12/2017	Ada Lovelace	10	Fly	9	9	£566.00
9	gmcglone93@dedecms.com	02/03/2018	F	14/11/2017	Ada Lovelace	1	Fly	9	9	£2,169.00
10	ischulter8d@devhub.com	09/03/2018	M	05/10/2017	Tim Berners-Lee	6	Coach	7	6	£789.00
11	hlovickcp@desdev.cn	03/03/2018	F	22/11/2017	Ada Lovelace	8	Coach	8	8	£330.00
12	mhaydene2@senate.gov	02/03/2018	F	24/09/2017	Ada Lovelace	4	Coach	9	9	£287.00
13	amitchley6f@ucsd.edu	04/03/2018	M	01/10/2017	Ada Lovelace	6	Fly	9	8	£1,671.00
14	kwhitehorned@wired.com	02/03/2018	F	17/08/2017	Ada Lovelace	5	Fly	7	7	£348.00
15	thumbatch27@multiply.com	05/03/2018	F	25/12/2017	Ada Lovelace	8	Coach	10	9	£277.00
16	wromen5@dyndns.org	09/03/2018	F	14/10/2017	Ada Lovelace	2	Fly	8	7	£268.00
17	gaggasgm@ovh.net	04/03/2018	M	11/12/2017	Ada Lovelace	9	Fly	9	8	£2,270.00
18	cmoth5h@webs.com	06/03/2018	M	05/10/2017	Ada Lovelace	8	Coach	8	9	£495.00
19	fturneauxx@icq.com	09/03/2018	F	29/09/2017	Sam Simson	2	Fly	3	8	£448.00
20	hmuscatqa@walmart.com	07/03/2018	F	14/12/2017	Ada Lovelace	6	Fly	7	9	£573.00
21	sscoinesgl@youku.com	06/03/2018	M	13/11/2017	Ada Lovelace	8	Fly	9	8	£1,181.00
22	emeers8k@huffingtonpost.com	05/03/2018	F	07/12/2017	Ada Lovelace	6	Fly	8	9	£304.00

Travel_data

Total Price Paid by Month

	Sum of Price Paid
⊕ Aug	£ 76,642
⊕ Sep	£ 78,407
⊕ Oct	£ 71,615
⊕ Nov	£ 74,060
⊕ Dec	£ 54,177
Grand To £	354,901

Months

Aug
Sep
Oct
Nov
Dec

Price Paid by Travel Type

Coach
Fly
Car

£194,673
£10,350
£149,878

Number of Bookings per Travel Type by Month

Months

Aug | Sep | Oct | Nov | Dec

	Au	Se	Oc	No	Dec
Car	3	2	4	3	3
Coach	34	45	58	30	29
Fly	61	64	52	63	48
Grand Total	**98**	**111**	**114**	**96**	**80**

Recommend to a Friend Ratings by Salesperson

Tim Berners-Lee
Sam Simson
Ada Lovelace

Average of Recommend to a Friend3
Min of Recommend to Friend2
Max of Recommend to a Friend

Ratings 1 - 10

Bookings per Month

Price Paid per Month by Travel Type

Dec
Nov
Oct
Sep
Aug

£- £10,000 £20,000 £30,000 £40,000 £50,000 £60,000

Fly
Coach
Car

Price Paid by Month

£100,000

Aug Sep Oct Nov Dec

Number of Bookings

70
60
50
40
30
20
10
0

Car | Coach | Fly

Aug
Sep
Oct
Nov
Dec

Transport Rating by Salesperson

Tim Berners-Lee
Sam Simson
Ada Lovelace

Average of Transport Rating
Min of Transport Rating
Max of Transport Rating

Rating 1 - 10

Booking Process Rating

56, 39, 43, 47, 53, 48, 44, 63, 48, 58

Ratings 1 - 10

Transport Rating

1, 6, 3, 1, 40, 88, 145, 147, 68

Ratings 1 - 10

Recommend to a Friend Rating

1, 3, 2, 4, 44, 55, 139, 219, 32

Ratings 1 - 10

Number of Sales by Sales Person

		Trend by Month
Ada Lovelace	425	
Tim Berners-Lee	61	
Sam Simson	13	

Booking Process Rating by Salesperson

Tim Berners-Lee
Sam Simson
Ada Lovelace

Average of Booking Process Rating3
Min of Booking Process Rating2
Max of Booking Process Rating

Rating 1 - 10

Price Paid per Salesperson

£9,696
£40,923
£304,282

Ada Lovelace
Tim Berners-Lee
Sam Simson

Analysis of Booking

Maximum	10
Minimum	1
Average	6

Analysis of Tansport

Maximum	10
Minimum	2
Average	8

Analysis of Recommend to a F

Maximum	10
Mimimum	1
Average	8

Salesperson Analysis

Salesperson	Total Price Paid
Tim Berners-Lee	£ 40,923.00

Ratings Analysi	Max	Min	Avg
Transport	10	6	8
Bookings	10	6	8
Recommend to Fri	7	1	6

Modern Technologies

Wider Implications

Cyber Security

Planning and Design
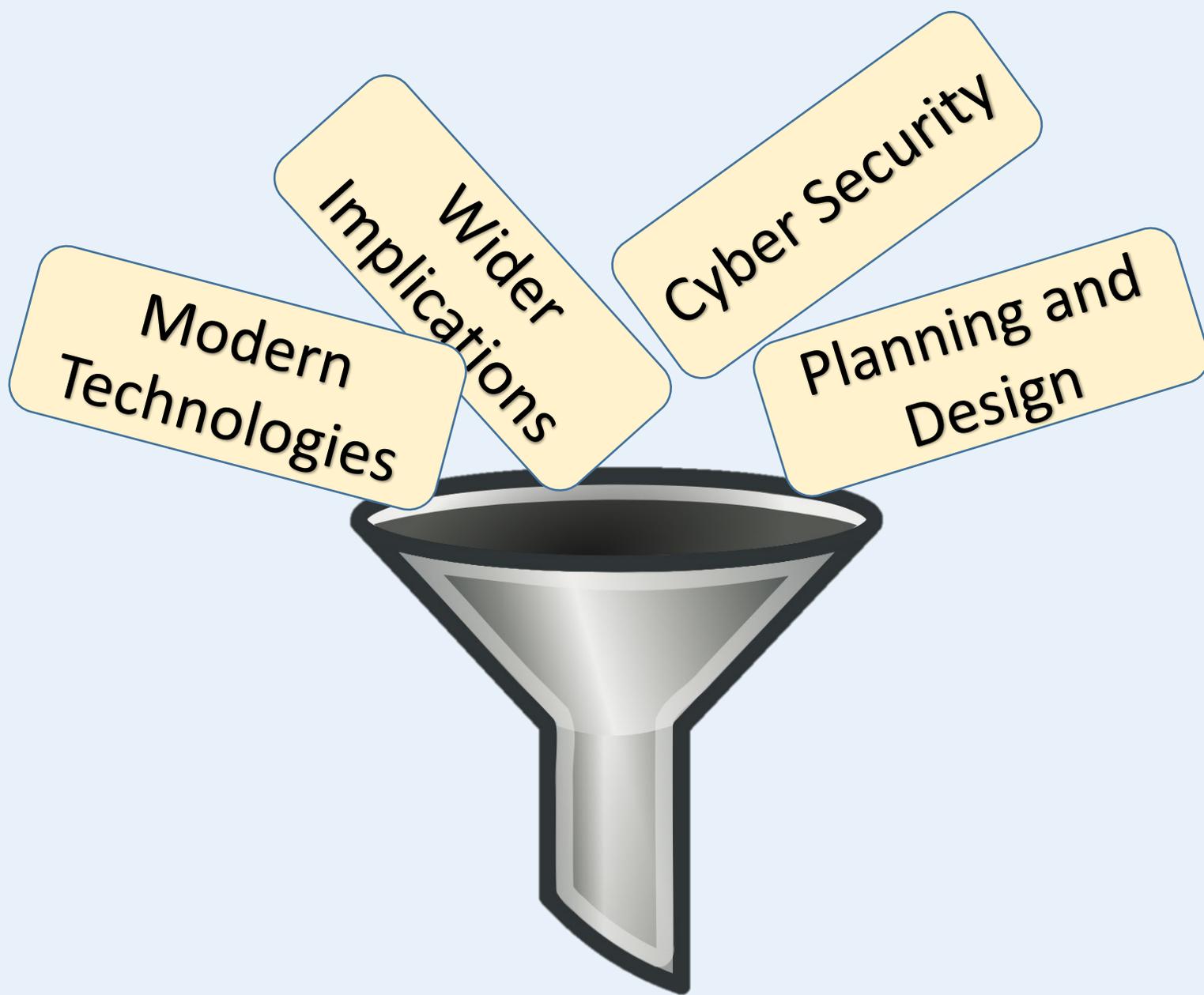
Component 3 Exam

Component 3 - Example Exam Questions

TechnoWhizz wants to introduce a video streaming service to provide content for their devices.

(b) Describe how 'Net neutrality' will help TechnoWhizz compete with more established video streaming services.

(3)

At present, staff who work at Chocawoca use a card entry system to gain access to their secret recipe rooms, cards are swiped at the entrance. They are considering changing this to use a biometric system as they think this will improve security.

(c) Explain **two** benefits of biometric systems to Chocawoca.

(4)

TechnoWhizz also have offices in New York, Hong Kong and Sydney. Their latest project is developing a new smartphone and designers from all offices will be involved.

(c) Discuss how modern technologies can be used to help the company manage this project.

(6)

Skills requirements for the course

- No subject level requirements for this course.
- **Strong written English skills required**. There is a lot of research for the theory side of Component 1 and 2
- **An understanding of Excel (spreadsheets)** and a keen desire to learn it will greatly help
- **Planning and organisational skills**. Students will be given fixed deadline to complete work

Please note that this course **can** be taken with the GCSE in Computer Science

Please feel free to ask any questions.