Semester 1 Examination, 2020
Question/Answer Booklet

EXAM SOLUTIONS

COMPUTER SCIENCE ATAR Year 11
Unit 1

Student Name: _____

Teacher's Name: Ms Wana Radzi

Time allowed for this paper

Reading time before commencing work:	ten minutes
Working Time:	two hours and thirty minutes

Materials required/recommended for this paper

To be provided by the supervisor
This Question/Answer booklet
Source Booklet

To be provided by the candidate

Standard items:	pens, pencils, eraser, correction fluid/tape, ruler, highlighters
Special items:	non-programmable calculators approved for use in this examination, Mathomat and/or Mathaid and/or any system flowchart template

Important note to candidates
No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised material. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this Paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of examination
Section One: Short answer	14	14	70	87	40
Section Two: Extended answer	4	4	80	96	60
				Total	100

Instructions to candidates

1. The rules for the conduct of the Western Australian Certificate of Education ATAR course examinations are detailed in the *Year 12 Information Handbook 2020*. Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in the spaces provided in this Question/Answer booklet. A blue or black pen should be used. Wherever appropriate, fully labelled diagrams, tables and examples should be used to illustrate and support your answers.

3. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question. Where no specific instructions are given, you should feel free to use a range of formats to express your knowledge and understandings.

4. Additional working space pages at the end of this Question/Answer booklet are for planning or continuing an answer. If you use these pages, indicate at the original answer, the page number it is planned/continued on and write the question number being planned/continued on the additional working space page.

See next page

Section One: Short answer 40% (87 marks)

This section contains **14** questions. You must answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

Question 1 (5 marks)

a) Describe the role of the system clock in the fetch execute cycle? (2 marks)

Description	Mark
System clock determines the timing of the fetch execute cycle	1
The pace of the system clock, called the clock speed, is measured by the number of ticks per second, current speeds are in the gigahertz range	1
Total	**2**
Sample answer: The processor relies on a small quartz crystal circuit called the system clock to control the timing of all computer operations. Each stage of the fetch-execute cycle is coordinated by the "ticking" of this clock. Previously processors used one or more clock cycles to execute each instruction. Processors today are superscalar, which means they can execute more than one instruction per clock cycle.	
Accept other answers	

See next page

b) The Central Processing Unit (CPU) is made up of several components other than the system clock. Choose one of these components and describe what it does. (3 marks)

Description	Mark
Name of component	1
Subtotal	**1**
Provides a detailed description of the CPU component	2
Provides superficial comment about the CPU component	1
Subtotal	**2**
Total	**3**

Sample answer:
Arithmetic Logic Unit (ALU): Performs all arithmetic operations like addition, subtraction, division and multiplication and logical operations of the computer system like <, >, and =.
Control Unit: The CU directs and coordinates most of the operations of the CPU, It tells the computer's memory, arithmetic and logic unit and input and output devices how to respond to the instructions that have been sent to the processor.
Registers: High speed storage locations, that temporarily hold data and instructions. On the CPU.
Program counter: The program counter is a register that contains the address (location) of the instruction being executed at the current time. As each instruction gets fetched the program counter increases its stored value by 1.
System Clock: Issues a steady high-frequency signal that synchronises all the internal components of the computer system including the CPU.
Data, address and control bus: A bus is a parallel data communication paths over which information is transferred. The buses contain logic that the CPU controls. The items controlled are the transfer of data, instructions, and commands between the functional areas of the computer: CPU, memory, and I/O.

Accept other answers

See next page

Question 2 **(5 mark)**

a) State **two (2)** advantages of using a solid-state drive (SSD) over a mechanical disk (HDD) to store data in a personal computer. (2 marks)

Description	Mark
States advantage of SSD over mechanical disk (1 mark each)	1-2
Total	**2**
Answer SSD has a faster access time, 35 to 100 microseconds which is nearly 100 faster than traditional HDDs. SSD is more reliable as they don't have any moving parts. HDD use magnetic platters which spin. SSD uses less power which equates to less cost to run. SSD is quieter as there are no moving parts. SSD are generally smaller in size which is space saving. SSD produces less heat.	
Accept other answers	

b) A mechanical disk (HDD) is which type of storage? (1 mark)

Description	Mark
Correctly circle secondary storage	1
Total	**1**

c) Outline **one (1)** reason to justify your selection from the previous question (question 2b). (2 marks)

Description	Mark
Outlines why HDD is secondary storage	2
Provides superficial comment about why HDD is secondary storage	1
Total	**2**
Answer Secondary storage is named as such because it doesn't have direct access to CPU. As a result, it is considerably slower than primary storage. Also known as auxiliary storage, secondary storage retains data until you overwrite or delete it. So even when you turn off the device, all data is intact on this medium.	
Accept other answers	

See next page

Question 3 **(6 marks)**

a) Explain how cache plays a role in speeding up processing time. (3 marks)

Description	Mark
Explains how cache speeds up processing with relation to the cache being located on or near the CPU	1
Supplies some relevant facts about how cache speeds up processing	2
Makes superficial comment(s) about how cache speeds up processing	1
Total	**3**
Answer Cache is defined as a small amount of faster, more expensive memory. Cache is close or on the CPU for faster access time. Cache is used to improve performance by storing recently accessed or frequently accessed data in its rapidly accessible storage media. Since it is physically closer than RAM, this is the first place the processor looks for instructions. If it finds the data it needs here, the processor can bypass the more time-consuming process of reading RAM or other storage devices.	
Accept other answers	

b) Cache is which type of storage? (1 mark)

Description	Mark
Correctly circle primary storage	1
Total	**1**

c) Outline **one (1)** reason to justify your selection from the previous question (question 3b). (2 mark)

Description	Mark
Outlines why cache is primary storage	2
Provides superficial comment about why cache is primary storage	1
Total	**1**
Answer Primary storage temporarily houses applications and data currently in use. Primary storage is often referred to as simply “memory”. Cache is known as CPU memory, cache memory stores instructions computer programs frequently call upon during operation for faster access, therefore primary storage.	
Accept other answers	

See next page

Question 4 **(3 marks)**

Suggest a physical preventative maintenance measure for the following scenarios.

Description	Mark
Correctly suggested physical preventative maintenance measure (1 mark each)	3
Total	**3**

a) A power surge due to a lightning storm destroyed a home computer plugged into the home power mains.

Answer: plug home computer into a power bar surge protector and/or un-plug the home computer during lightning storms.

b) Your CPU temperature is increasing due to restricted airflow on the outside of the case near the intake fan.

Answer: Need to remove the dust from the outside of the case to allow airflow into the case. This may be done by wiping the dust or if safe, using a vacuum cleaner. Also accept the use of compressed air but only from the inside as you should not blow air (and potentially dust) into the system unit.

c) Sun and heat damage to a desktop computer near the window of an office desk.

Answer: Install curtains on office windows, move the desktop computer away from the direct sunlight.

Accept other answers

Question 5 **(3 marks)**

a) State **one (1)** advantage prototyping has over the System Development Life Cycle (SDLC).

(1 mark)

Description	Mark
States one advantage of prototyping	1
Total	**1**

Sample Answer:
The main advantage of a prototype is users can work with the system before it is completed to make sure it meets their needs.
User is involved through the process, which increases likelihood of user acceptance of the final implementation.
Small-scale mock-ups of the system are developed following an iterative modification process until the prototype evolves to meet the user's requirements.
Encourages experimentation and innovation.
While most prototypes are developed with the expectation that they will be discarded, it is possible in some cases to evolve from prototype to working system.

Accept other answers

b) Describe the role of the user when prototyping is used to develop a new system.

(2 marks)

Description	Mark

See next page

Describe the role of the user in prototyping	2
Provides superficial comment(s) about the role of the user in prototyping	1
Total	**2**
Sample Answer: The user is essential to the prototyping process, the user should experiment with the prototype, give open and honest feedback and suggest additions and deletions to the functionality of the prototype.	
Accept other answers	

Question 6 **(3 marks)**

Project management often refers to terms such as planning, scheduling, budgeting and tracking. Define the term 'tracking' and state why it is an important step to ensure the project's success.

Description	**Mark**
Defines the term tracking in relation to project management	2
Provides superficial comment(s) about the term tracking	1
Subtotal	**2**
States the importance of tracking to keep the project on schedule	1
Subtotal	**1**
Total	**3**
Sample answer: Project tracking consists of comparing the project plan with the actual development of the project. Tracking measures the progress of the schedule. Any change from the original plan are identified and managed to keep the project within scope, on time and within budget.	
Accept other answers	

Question 7 **(4 marks)**

a) State **two (2)** activities that occur in the development phase of the System Development Life Cycle (SDLC). (2 marks)

Description	**Mark**
States an activity that occurs in the development phase	1-2
Total	**2**
Sample answer: The development phase is when the architecture is finalised and hardware acquired, technical definition of data access and other system components is completed, code, document and test plans are developed. Possible answers: • Hardware and software acquisition • Acquire servers, computers and software needed to store and process system • Construction and testing • Adding comments to the source code (internal documentation) and work on user instructions	

See next page

(external documentation)
Accept other answers

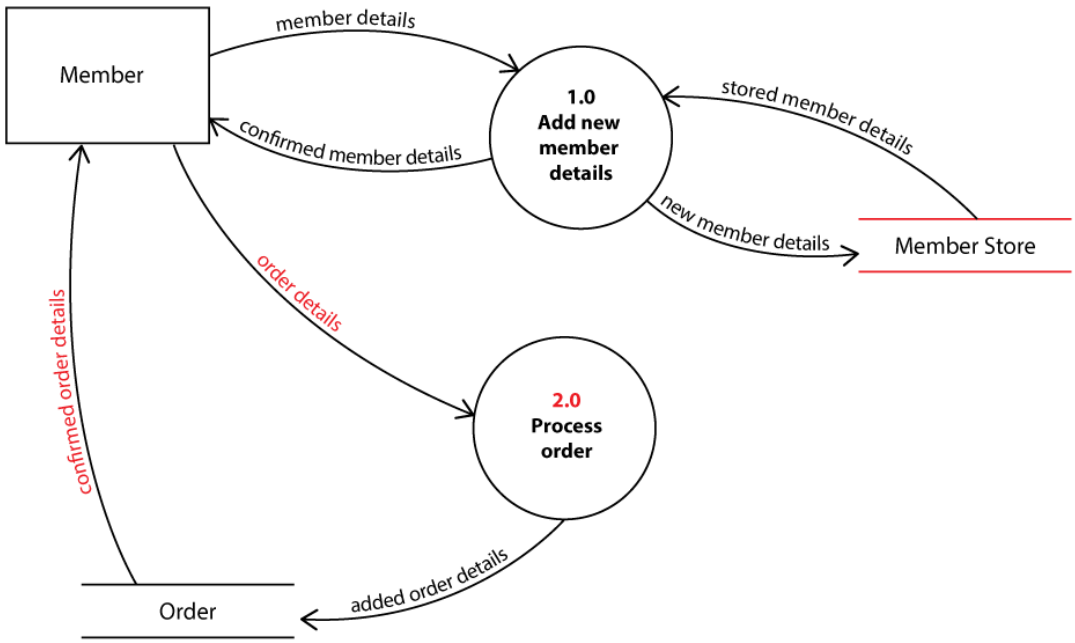
See next page

b) Describe the purpose of an Entity Relational Diagram (ERD)? (2 marks)

Description	Mark
Describes the purpose of an entity relationship diagram	2
Provides superficial comment(s) about the purpose of an entity relationship diagram	1
Total	**2**
Sample answer: An entity relationship diagram (ERD) is a visual tool that allows database developers/designers a way to show the structure of the tables/entities in a database and their relationships. It can show entities, relationships, cardinality, key fields and non-key fields.	
Accept other answers	

Question 8 **(4 marks)**

Outline **four** errors in the following level 0 data flow diagram below.

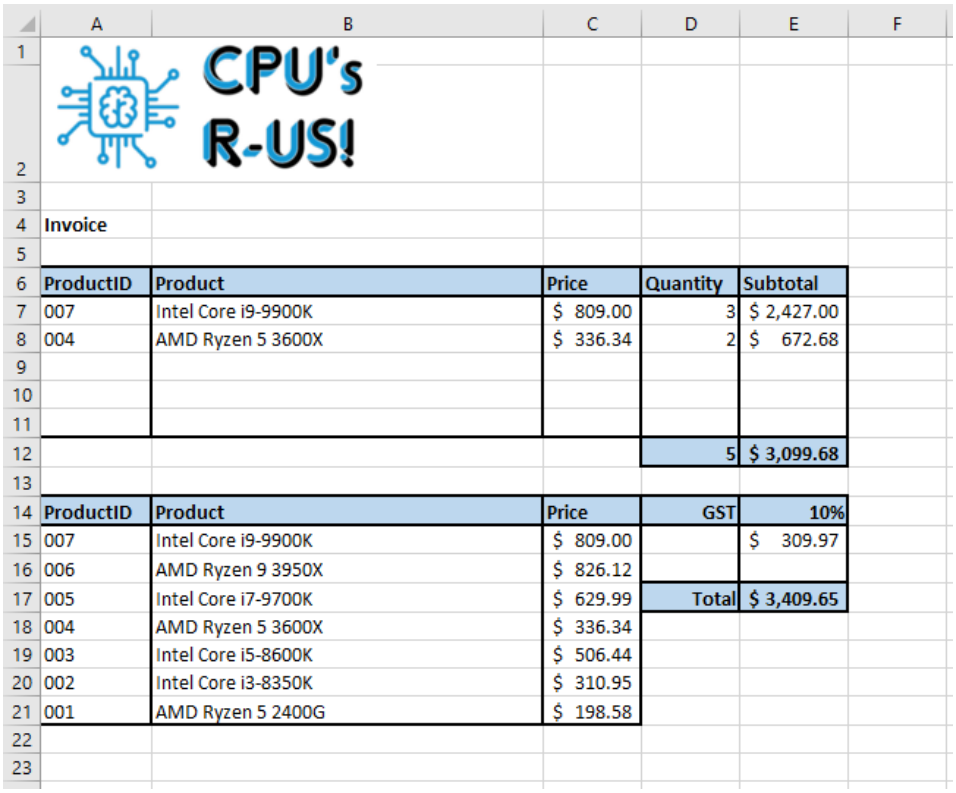


Description	Mark
Incorrect data flow from the "Order" store to the external "Member" entity	1
The data flow "order details" is not labelled	1
The process "Process order" is not numbered	1
Incorrect symbol for the "Member store" data store	1
Total	**4**

See next page

Question 9 **(8 marks)**

Use the image below to answer all parts of this question about spreadsheets.



	A	B	C	D	E	F
1		CPU's R-US!				
2						
3						
4	Invoice					
5						
6	ProductID	Product	Price	Quantity	Subtotal	
7	007	Intel Core i9-9900K	$ 809.00	3	$ 2,427.00	
8	004	AMD Ryzen 5 3600X	$ 336.34	2	$ 672.68	
9						
10						
11						
12				5	$ 3,099.68	
13						
14	ProductID	Product	Price	GST	10%	
15	007	Intel Core i9-9900K	$ 809.00		$ 309.97	
16	006	AMD Ryzen 9 3950X	$ 826.12			
17	005	Intel Core i7-9700K	$ 629.99	Total	$ 3,409.65	
18	004	AMD Ryzen 5 3600X	$ 336.34			
19	003	Intel Core i5-8600K	$ 506.44			
20	002	Intel Core i3-8350K	$ 310.95			
21	001	AMD Ryzen 5 2400G	$ 198.58			
22						
23						

CPU's R-US! Want to automate their manual invoicing system. They have decided to use a spreadsheet. With this new system, they simply need to enter a ProductID in column A as well as a quantity in column D. The product name and price are both propagated from the data in cells A15:C21.

a) Complete the formula that is being used in cell C7 to retrieve the price of the CPU?
(3 marks)

Description	Mark
A7	1
$A$15:$C$21 (absolute cell referencing NOT essential but preferred)	1
3	1
Total	**3**
Sample Answer: =VLOOKUP(A7,$A$15:$C$21,3,FALSE) 1 mark for each part of the equation	

See next page

b) A cell is a box in which you can enter a single piece of data of different types. What spreadsheet terminology is used to identify the data type in cell B6? (1 mark)

Description	Mark
Correct spreadsheet term	1
Total	**1**
Sample Answer: Label	

c) Write the functions to find the total in cell E12. Your function should add to the subtotal if another product is entered. (2 marks)

Description	Mark
SUM	1
(E7:E11)	1
Total	**2**
Sample Answer: =SUM(E7:E11)	

d) Use cell E12 to describe the term 'Automatic Recalculation' in spreadsheet. (2 marks)

Description	Mark
Correct description	1
Use E12 and other related cells in the description	1
Total	**2**
Sample Answer: Automatic Recalculation occurs when one value or calculation in a spreadsheet is changed. All values in the spreadsheet that use that value are automatically recalculated. In this case, E12 displayed value will be affected by any changes in cells E7:E11	

See next page

Question 10 **(3 marks)**

Match each of the following terms with its alternative name in the table below.
One has been done for you.

- Table
- Attribute
- Character
- Record

Description	Mark
Correctly defined terms (1 mark each)	1-3
Total	**3**
Sample Answer: Byte = Character Tuple = Record Field = Attribute	

Question 11 **(9 marks)**

a) State what the following boot process acronyms stand for. (2 marks)

The first has been done for you.

Description	Mark
Correctly states the boot process acronyms (1 mark each)	1-2
Total	**2**
Sample Answer: BIOS = Basic Input Out System POST = Power-On Self Test	

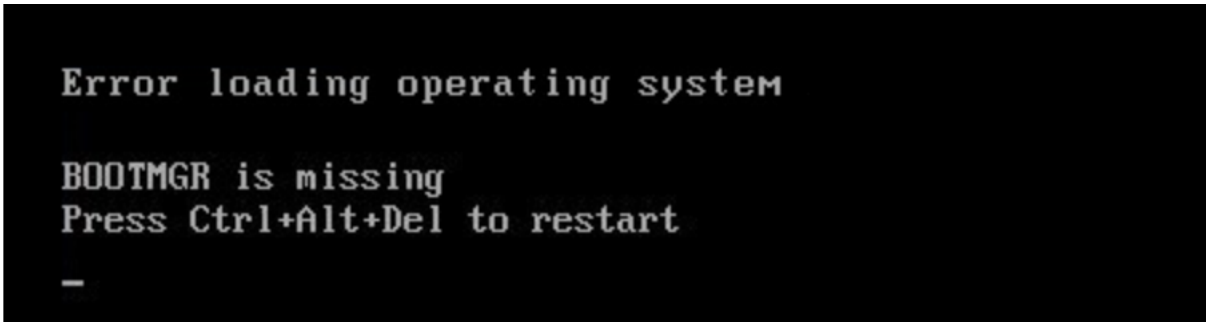
See next page

b) Outline and describe the **five (5)** key steps of the boot process. (5 marks)

Description	Mark
Power up	1
Power-on self test	1
Find a boot device	1
Load the operating system	1
Transfer control	1
Total	**5**

Sample Answer:
Power Up - The power button activates the power supply in the PC, sending power to the motherboard and other components.
Power-On Self Test - The PC performs a power-on self-test (POST). The POST is a small computer program within the BIOS that checks for hardware failures and compares components with last know configuration.
Find a Boot Device - The BIOS (basic-input-output-system) is software stored on a flash memory chip ROM or read only memory. In a PC, the BIOS is embedded on the motherboard. The BIOS confirms there's a boot loader in secondary storage, then it loads that boot loader into memory (RAM).
Load the operating system - This boot loader finds the operating system and loads it into memory.
Transfer control - Once the OS is in memory it takes control and loads applications and user preferences.

c) During the boot process the following error occurred. Explain **two (2)** possible reasons for this error to be displayed: (2 marks)



Description	Mark
Correctly states a possible reason for the error (1 mark each)	1-2
Total	**2**

Sample Answer:
The error message arises when an operating system is not found during the boot process. This may be due to an error with the boot device (HDD/SSD), the boot device not being plugged in or powered up or an error in the BIOS where the boot device is incorrectly configured.

Accept other answers

See next page

Question 12 **(5 marks)**

a) Identify two (2) reasons digital communication etiquette is so important for employees when using the company's Information and Communication Technology (ICT) systems. (2 marks)

Description	Mark
Correctly states a valid reason that digital communication etiquette is important for a business. 1 mark each	1-2
Total	**2**
Sample Answer: Etiquette and communication are considered vitally important to the successful running of a business. When dealing with contacts in and outside of the business your communication influences how the company may be viewed. Digital communication could include, telephone, email, video conferencing, instant messaging and social media, with these new communication methods, the etiquette of business communication has changed. Whether you communicate with customers, partner companies, vendors or only your co-workers, it's vital to get your message across clearly, effectively, and professionally and avoid making mistakes that could put you and your company in a bad light.	
Accept other reasonable responses	

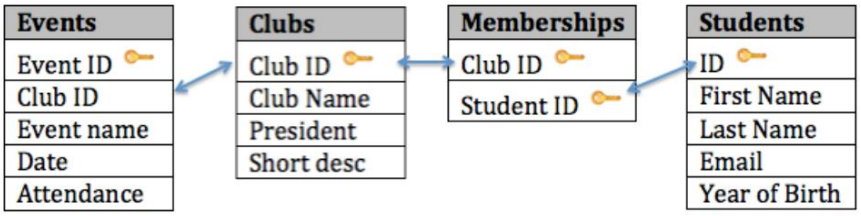
b) State **three (3)** rules you would implement for good digital communication etiquette in a company environment. (3 marks)

Description	Mark
Correctly states a rule you would implement for goof digital communication (1 mark each)	1-3
Total	**3**
Sample Answer: Keep all work emails and communication professional and on task All work emails and communication should be truthful and positive Employees must abide by the employer's code of conduct when communicating Data and files shared through company communication must be free of copyright and piracy laws Must not upload, post or email any content that is unlawful, threatening, abusive, harassing, defamatory, obscene, offensive, hateful, sexist, racially or ethnically harmful. Collect, store or post personal data about other employees Pay attention to grammar and spelling, don't use slang or colloquial language Do not forward junk emails	
Accept other reasonable responses	

See next page

Question 13 **(20 marks)**

Use the image below to answer all parts of Question 13 about database terms.



a) Describe each of the following terms and provide **one (1)** example for each from the table structure above. (6 marks)

Description	Mark
For each of the **three** terms:	
Outline correct meaning of term	1
Use of an example	1
Total	**6**
Sample Answer: Primary Key: A field that uniquely identifies the record. Example: EventID, ClubID, StudentID Attribute: A name which defines a field in a database table. Example: Event name, Date, Attendance …etc Relation: A table within a (relational) database. Example: Events, Clubs, Memberships, Students	
Accept other answers	

b) List **one (1)** foreign key from the tables above. (1 mark)

Description	Mark
Correctly list one foreign key	1
Total	**1**
Sample Answer: ClubID_FK, StudentID_FK	

c) Explain which data type you would use for the following: (4 marks)

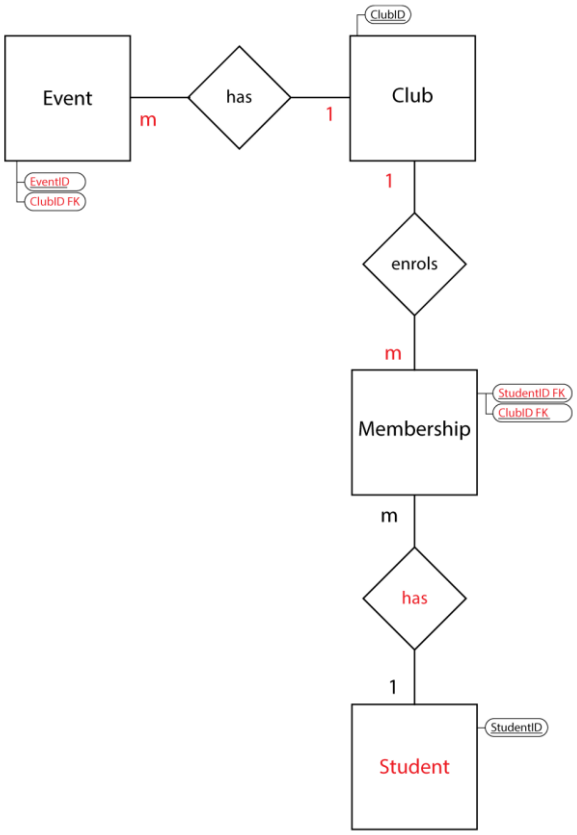
Description	Mark
State the correct data type	1-3
Total	**3**
Sample Answer: Event Date: Date/Time Student First Name: short text (string) StudentID: Auto number or number Club short description: short text / long text (string)	

See next page

d) The following describes the entity relationship (ER) diagram for Question 13. (9 marks)

- a club can have one or more events
- a club has many memberships
- a student can have many memberships to various clubs

Complete the entity relationship (ER) diagram making sure to label all entities, relationships, cardinality, primary and foreign keys. You do not need to include non-key attributes.



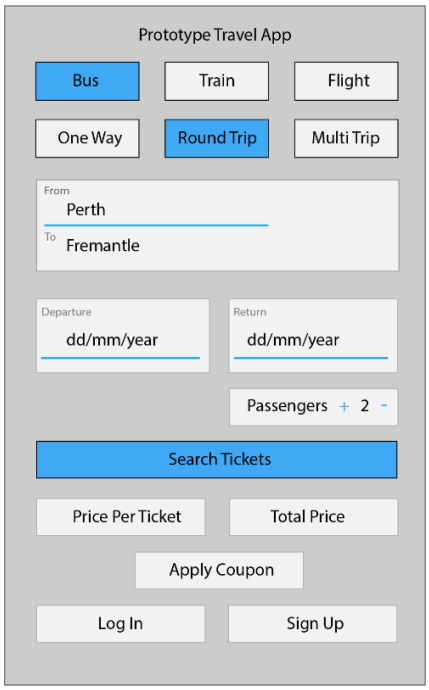
Description	Mark
Entities	
Student	1
Primary Keys	
EventID, ClubID/Student ID (Composite) OR also accept MembershipID	2
Foreign Keys	
ClubID FK, ClubID FK and StudentID FK	3
Cardinality	
Event → Club – M:1 Club → Membership 1:M	1 1
Relationships	

See next page

enrol or has (name may vary)	1
Total	**9**

Question 14 **(9 marks)**

Use the image below to answer all parts of Question 14 about visual interface design.



a) Comment on **two (2)** strengths and **two (2)** weaknesses in the design of this visual interface for a prototype travel app. (4 marks)

Description	**Mark**
Comment on strengths (1 mark each)	1-2
Comment on weaknesses (1 mark each)	1-2
Total	**4**
Sample Answer: Strengths: The design is intuitive and familiar, easy to accomplish the task of booking tickets The design is efficient due to the fact the user can quickly learn to use the design The design is clear and concise, icons and buttons have appropriate space to be selected There are cues to correctly enter validated data i.e. dd/mm/year Weaknesses: Log in and sign up links should be at the top of the user interface to save time for return users Departure and return dates need to be entered with a keypad, a pop out calendar would be more user friendly. Apply coupon does not have an input area. Little to no space for brand recognition and logo.	
Accept other answers	

See next page

b) The travel app will be collecting credit card details to pay for tickets. Explain how public and private key encryption could be used to protect this data. (3 marks)

Description	Mark
Explains how public and private key encryption works and can be used to protect the data	3
Supplies some relevant facts about the concept of public and private key encryption	2
Makes superficial comment(s) about public and private key encryption	1
Total	**3**
Sample Answer Encryption is a process of converting readable data into unreadable characters to prevent unauthorised access. Encrypted data is treated just like any other data. It can be stored, sent over the internet from an app to a server or cloud service. To read the data, the recipient must decrypt or decipher the data into a readable form. Private key encryption is where both the sender and receiver of the data must use the same secret key to encrypt and decrypt the data. Public key encryption uses two encryption keys: a public key and a private key. The public key is made known to message originators and recipients. A message encrypted with the public key can be decrypted only with the corresponding private key which his known only to the receiver.	
Accept other answers	

c) Outline **two (2)** legal requirements the travel App would have if the organisation was to store information about individuals. (2 marks)

Description	Mark
Outlines a legal requirement (1 mark each)	1-2
Total	**2**
Sample Answer: Privacy laws in Australia would require the following 1. Information collected and stored about individuals should be limited to what is necessary to carry out the fu 2. Once collected, provisions should be made to restrict access to the data to those employees within the organisation who need access to it to perform their job duties. 3. Personal information should be released outside the organisation collecting the data only when the person has agreed to its disclosure. 4. When information is collected about an individual, the individual should know that the data is being collected and have the opportunity to determine the accuracy of the data.	
Accept other answers	

END OF SECTION ONE

See next page

Section Two: Extended answer 60% (96 Marks)

This section has **4** questions. Answer all questions. Write your answers in the spaces provided.

Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 80 minutes.

Question 15 **(40 marks)**

Refer to the Source booklet to answer this question.

a) The analyst has decided to use the System Development Lifecycle (SDLC) for the development of this project. Outline **two (2)** benefits of using the SDLC for project management. (4 marks)

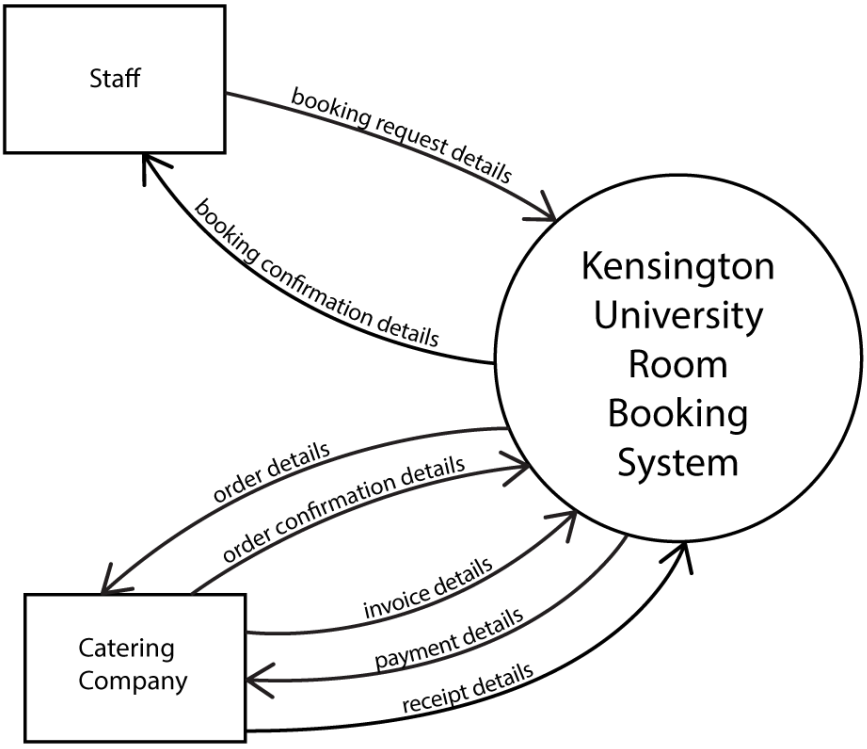
Description	Mark
For each of the **two** terms:	
Outlines a benefit of SDLC	2
Provides superficial comment(s) about the benefit	1
Total	**4**
Sample Answer: The SDLC is a highly structured project management technique. It allows the project manager to be able to plan out the project from start to finish and create key milestones for each stage of the project and to keep the project on schedule through tracking. It also allows project managers to be able to have a good understanding of the budget for the project.	
Accept other answers	

b) The system analyst has chosen to model the design of the new system. Outline why the analyst might start with a context diagram? (2 marks)___

Description	Mark
Outlines why an analyst would start with a context diagram	2
Makes superficial comment(s) about a context diagram	1
Total	**2**
Sample Answer: The context diagram is the top level of a set of hierarchically related diagrams each move down the diagram set. This diagram represents the system being modelled as a single circle interacting with external entities. The emphasis of this diagram is to identify the boundary and scope of the system.	
Accept other answers	

See next page

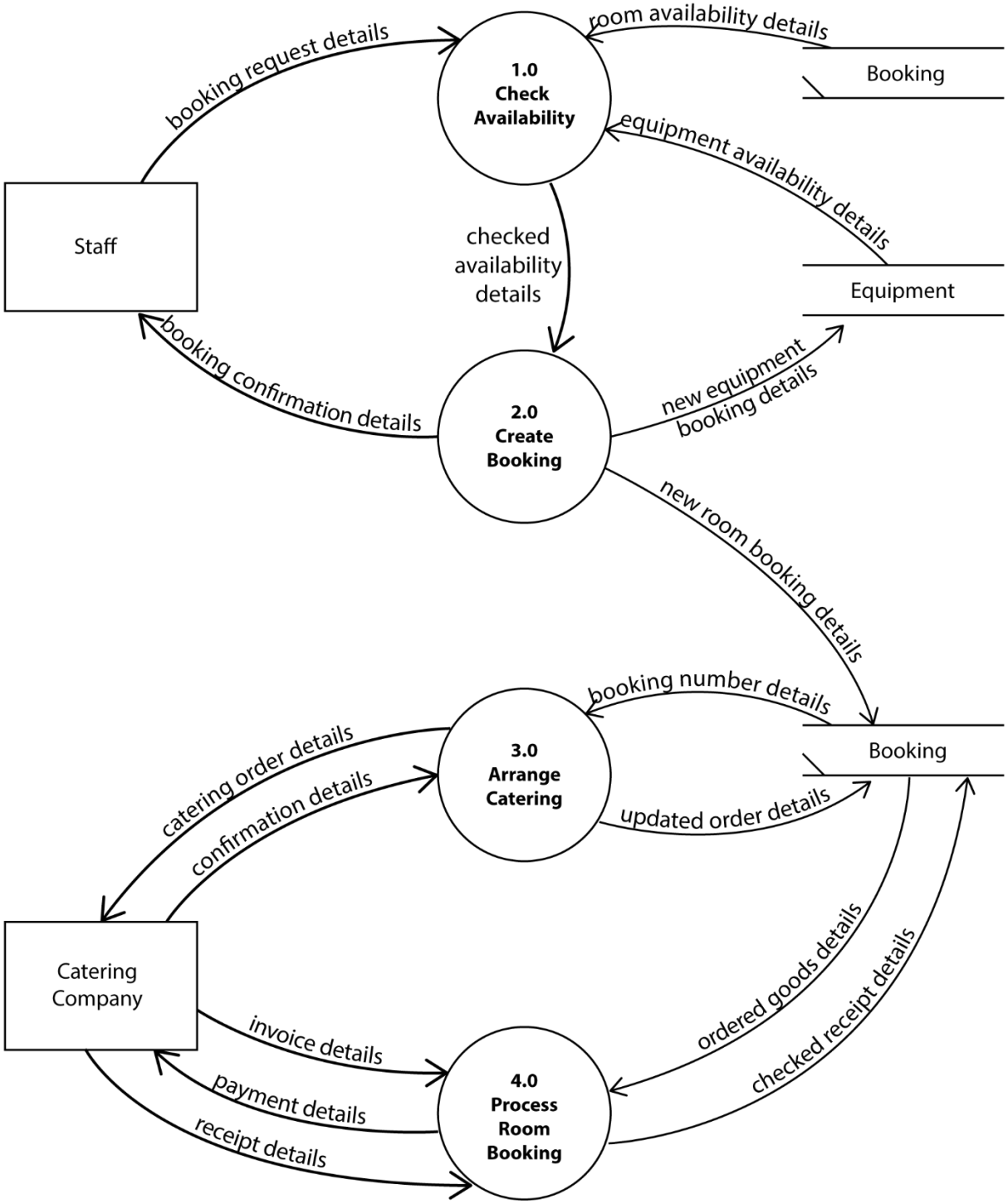
c) Use the source booklet to complete the unfinished Context Diagram for the Kensington University's new system. (10 Marks)



Description	Mark
Entities	
Staff, Catering Company	2
System	
Kensington University Room Booking System	1
Flows to the System from Staff	
Booking request details	1
Flows from the System to Staff	
Booking confirmation details	1
Flows to the Caterer from the system	
Order confirmation details, Invoice details, Receipt details	3
Flows to the System from Caterer	
Order details, Payment details	2
Total	**10**

See next page

d) Use the source booklet to create the level 0 data flow diagram (DFD) for the system below. (24 Marks)



See next page

Description	Mark
Entities	
Staff, Catering Company	2
Processes	
Check Availability, Create Booking, Arrange Catering, Process Room Booking	4
Data Stores	
Booking, Equipment	2
Flows to the Check Availability process	
Booking request details, room availability details, equipment availability details	3
Flows from the Check Availability process	
Checked availability details	1
Flows from the Create Booking process	
Booking confirmation details, new equipment booking details, new room booking details	3
Flows from the Arrange Catering process	
Catering order details, updated order details	2
Flows to the Arrange Catering process	
Confirmation details, booking number details	2
Flows from the Process Room Booking process	
Payment details, checked receipt details	2
Flows to the Process Room Booking process	
Invoice details, receipt details, ordered goods details	3
Total	**24**

See next page

Question 16 **(8 marks)**

Refer to the image in the source booklet and answer the following questions.

a) Examine the meeting room booking card. The analyst noted that the booking card is missing some important data. State **two (2)** pieces of data not currently being collected correctly and describe the likely consequence of each missing data. (2 marks)

Description	Mark
For each of the **two** pieces of data:	
Correctly identifies the missing data (1 mark each)	1
Total	**2**
Sample Answer Number of seats: The room might not have enough seats to hold all the attendees of the meeting. Technology needed: The room might not have the technology needed to run the meeting.	

b) The analyst suggested that the manual form doesn't allow for any data validation. Discuss the impact of data validation when gathering data. (3 marks)

Description	Mark
Correctly discusses the impact of data validation when gathering data	2
Provides superficial comments about the impact of data validation when gathering data	1
Subtotal	**2**
Gives a correct example from the manual form	1
Subtotal	**1**
Total	**3**
Sample Answer Data validation is a crucial to ensure the data the business collects is accurate, useful and timely. Data validation is used to check data before it is stored so that good business decisions can be made from the accurate data that is in the company's system. Examples: include the date format required i.e. dd/mm/year The form could also suggest 24 hour start and finish times i.e. 15:30 pm	

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c) The receptionist has highlighted that they know how to use a spreadsheet. Explain why a database management system (DBMS) would be a better solution for the meeting room booking system. (3 marks)

Description	Mark
Explains in detail the benefits of a DBMS over a spreadsheet	3
Makes general comments about why a DBMS may be better	2
Identifies aspect(s) of the properties of a DBMS	1
Total	**3**

Sample Answer
Reducing Data Redundancy – single location for data i.e. not multiple copies of a spreadsheet booking system. Forms and validation rules can be used to collect unique booking and reduce repeated data
Sharing of data – simultaneous access to the booking system, multiple people can use the booking system at once, not like a spreadsheet which only one person can work on and edit the spreadsheet at a time
Data Integrity - data is accurate and consistent in the database, can create validation rules for the booking system so that accurate data is used to complete the bookings
Privacy – authorised access of data, the admin can have higher permissions than the lecturer or attendee
Privacy – levels of access ensuring only authorised people have access to the data
Backup and recovery – DBMS take care of backup and recovery, easily backing up and protecting the current bookings in case of a disaster.

Accept all reasonable responses.

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Question 17 **(27 marks)**

Below is a spreadsheet the receptionist at Kensington University stores about the bookings. Use this to answer all parts of the question.

	A	B	C	D	E	F	G
1	RoomName	BuildingName	**MaxSeats Available**	Equipment	StaffFirstName	StaffSurname	StaffPhone
2	P101	Patten	**10**	Trestle table	Billy	Somers	0431297077
3	C303	Cromwell	**30**	Laptop and data projector	Danielle	Palermo	0431215979
4	W121	Wellesley	**12**	Coffee cups and spoons	Alice	Strait	0431257981
5	J151	Jenkin	**15**		Alice	Straite	0431257981
6	J151	Jenkins	**15**	Data projector	Mattie	Crow	0431262969
7	P101	Patten	**10**		Bernice	Harden	0431269307
8	W121	Welesley	**12**	Video and TV	Lawrence	Cloyd	0431206690
9	W121	Wellesley	**12**	TV	Shelley	Falkner	0431250889
10	P101	Patten	**10**	Data Projector	Lawrence	Cloyd	0431206690
11	C303	Cromwell	**30**		Billy	Somers	0431297077
12	P101	Patten	**10**	Coffee cups and spoons	Alan	Calder	0431237830
13	W121	Welesley	**12**		Michelle	Patterson	0431282348
14	W121	Wellesley	**12**	Trestle table	Melinda	Favela	0431283472
15	C303	Cromwell	**30**	Data Projector	Shelley	Falkner	0431250889

a) Explain the concepts of data integrity using an example from the table. (4 marks)

Description	**Mark**
Explains the concept of data integrity	3
Makes general comment(s) about the concept of data integrity	2
Identifies aspects of the concept of data integrity	1
Subtotal	**3**
Uses an example from the table	1
Subtotal	**1**
Total	**4**
Sample Answer **Data integrity:** Relates to the accuracy and consistency of the data. The current bookings are showing inaccurate and inconsistent data. For instance, "Wellesley" and "Jenkin" building names have 2 different spellings. Staff first name, surname and phone numbers are listed multiple times. This has caused an error as Alice Strait 0431257981 has had her name spelt incorrectly in another record.	
Accept all reasonable responses.	

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b) The data in the equipment column does not appear to be atomic. Explain the term using an example from the table and state what could be done to rectify the issue in the new system? (4 marks)

Description	Mark
Correctly describes the term atomic	2
Provides aspects of the properties of atomicity	1
Subtotal	**2**
Use of correct example from the table	1
Subtotal	**1**
States appropriate technique to rectify the problem	1
Subtotal	**1**
Total	**4**

Sample Answer
Atomicity is a field contents which cannot be further logically divided into other fields or smaller data. This will improve the functionality of the database as the fields will be able to be queried i.e. how many data projectors are currently being used.

Example - The equipment field is not atomic as there are multiple different bits of information

Technique – the equipment field needs to be broken down into separate fields for Laptop, Data projector, Video, TV, trestle table etc.

Accept all reasonable responses.

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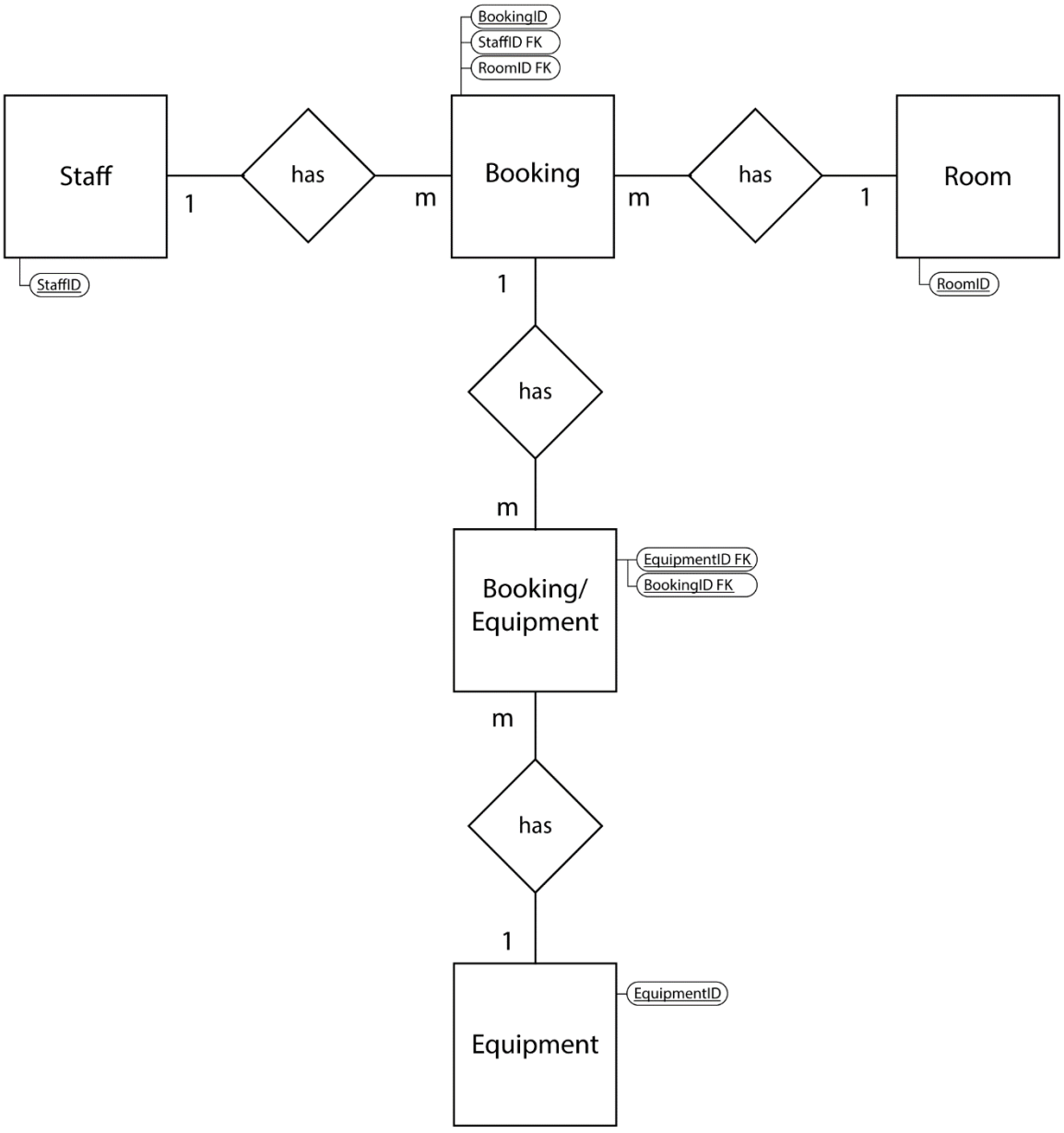
c) Complete the Entity Relationship (ER) Diagram for this database in the area below using Chen's notation. Ensure you resolve all many to many relationships. Include Primary keys, Foreign keys, cardinality and relationships. You do not need to include non-key fields. (19 marks)

- Staff can book many rooms and each room can be booked by many staff
- Equipment can be arranged for each room booking. Each booking can have many types of equipment. Each piece of equipment can be used on many different room bookings.



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Description	Mark
Entities	
Staff, Booking, Equipment, Booking/Equipment, Room	5
Primary Keys	
StaffID, BookingID, RoomID, EquipmentID, EquipmentID/BookingID OR EquipBookingID	5
Foreign Keys	
StaffID FK, RoomID FK, EquipmentID FK, BookingID FK	4
Cardinality	
Staff → Booking – 1:M Booking → Room - M:1 Booking → Booking/Equipment- 1:M Booking/Equipment → Equipment – M:1	4
Symbols	
Correct Chen's notation	1
Total	**19**

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Question 18 **(21 marks)**

a) The receptionist has been complaining that her monitor flickers from time to time. Outline the steps you would take to diagnose and fix the fault. (4 marks)

Description	Mark
Correctly outlines steps that could be used to diagnose the fault	2
Identifies aspects of steps that could be used to diagnose the fault	1
Subtotal	**2**
Correctly outlines steps to fix the fault	2
Identifies aspects of steps that could be used to fix the fault	1
Subtotal	**2**
Total	**4**

Sample Answer

Diagnose the fault

1. Check the cable from the computer system to the monitor, are there any cuts or exposed wires
2. Check the connectors at the end of the cable from the monitor to the computer, check not loose
3. Check power cable to the monitor, ensure there are no cuts or exposed wires, connection to the monitor is not loose
4. Monitor and power cables could be swapped with ones known to work well to identify the fault
5. Are the most current drivers installed for the monitor

Fix the fault

1. Replace the cable from the computer system to the monitor
2. Replace the power cable
3. Clean and clear the connectors of any dirt and grime
4. Install most current drivers for the monitor
5. Replace the monitor

Accept all reasonable responses.

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When you inspect the receptionist's desktop computer you see that she is running Windows 7 with Microsoft Office 2000. Her specifications are listed in the table below.

Product components	System Specifications
CPU	Intel® Pentium 3™, 1GHz
RAM	512MB, SDRAM, 100MHz
Hard Drive	80GB HDD
Graphics Card	NVIDIA® GeForce® 256
Monitor	17'' CRT
Operating System	Windows 7

b) The new system will be running Windows 10 Pro with Office 365. Explain why her old desktop computer will no longer be appropriate for running the new system.

(3 marks)

Description	Mark
Correctly explain why her old desktop will no longer be appropriate	3
Makes general comment(s) about the inappropriateness of the old system	2
Provides superficial comment(s) about the old system	1
Total	**3**
Sample Answer The Windows 10 Pro operating system requires at least 1 GB of RAM with 16GB of storage for the installation. Office 365 requires a processor 1.6GHz or faster with at least 2GB of RAM and 4GB of storage. The receptionist's computer system doesn't meet the minimum requirements of the software, this will cause issues as the system won't be able to process the software efficiently causing lags and even hardware failures.	
Accept all reasonable responses.	

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c) The receptionist has had the same password for over 5 years, and she admits that it is just the word "password". The new booking system has the ability to force strong passwords. Describe **two (2)** password rules would you suggest to make the system more secure. (4 marks)

Description	**Mark**
For each of the **two** pieces of data:	
Correctly describes an adequate password rule	2
Provides superficial comment(s) about a password rule	1
Total	**4**
Sample Answer Proper password security practice is incredibly important for protecting and safeguarding data on computer systems and computer networks. Some suggestions to make the system more secure could include; 1. Password length - at least 8 characters or more 2. Use upper and lower characters, numbers and special characters 3. Unique passwords, do not allow staff to reuse the same password twice 4. Use 2 factor authentication if possible	
Accept other answers.	

d) To ensure the integrity of the data Kensington University stores on their staff and students, they have decided to implement the use of biometrics to provide full access to their primary database. Describe **two (2)** forms of biometrics that could be used in this situation.

(4 marks)

Description	**Mark**
For each of the **two** forms of biometric:	
Correctly describes the form of biometrics and its possible use in authentication	2
Provides superficial comment(s) about the form of biometrics	1
Subtotal	**2**
Total	**4**
Sample Answer **Finger print** It would be possible to get hold of a finger print scanner that could authenticate valid finger prints against those scanned. Finger prints are unique to an individual and as such provide a highly secure method of authentication. **Iris scanning** Similar to finger print scanning, but instead scanning the iris's to determine the validity of the user trying to log in.	
Accept other answers.	

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e) Kensington University has decided to implement an SOE. Expand the acronym and describe the purpose of SOE. (3 marks)

Description	Mark
Standard operating environment	1
Subtotal	**1**
Describes the purpose of a standard operating environment	2
Provides superficial comment(s) about a standard operating environment	1
Subtotal	**2**
Total	**3**
Sample Answer The purpose of a standard operating environment is to provide IT hardware and software consistency across an organisation to reduce IT problems. Many SOE's mandate strict control over the types of computer hardware, software and drivers that may be purchased/used/installed. In this way, the tech support specialists in the organisation only have to deal with issues that a rise under a limited combination of ICT infrastructure. A common technique with SOE is to create a software image which is able to be installed on hardware easily.	
Accept other answers.	

f) The receptionist needs a word processor on her home computer. A friend at work has given her a flash drive with Microsoft Office on it. Explain the legal implications for her installing the software on her PC.

Description	Mark
Explains the concept of software piracy and the legal implications	3
Makes general comment(s) about software piracy and the legal implications	2
Provides superficial comment(s) about software piracy	1
Total	**3**
Sample Answer If the receptionist was to install the software she would be taking part in software piracy. When someone purchases a licence to use software, the licence is usually for installation on one device. If the software is shared around, the licence (legal ability to use the software) is not transferred.	
Accept all reasonable responses.	

END OF EXAMINATION

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