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ST BENEDICT'S COLLEGE



SUBJECT	Information Technology	PAPER	Theory Exam
GRADE	12	DATE	July 2017
EXAMINER	Mr R Engelbrecht	MARKS	180
NAME	MEMORANDUM	MODERATORS	Cluster
USER NAME		DURATION	3 hours
PASSWORD			

COGNITIVE LEVELS

LOW ORDER	31 %	MIDDLE ORDER	38 %	HIGH ORDER	31 %
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PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 22 pages. Please check that your question paper is complete.
2. Read the questions carefully and make sure that you answer all parts of each question.
3. Answer ALL questions – there are no options in this paper.
4. Show all working where applicable.
5. A non-programmable calculator may be used.
6. It is in your own interest to write legibly and to present your work neatly.
7. Answer all the questions on the question paper in the spaces provided.
8. Extra paper has been included on the last two pages should you need it to complete any of the answers.

	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Total
Possible Marks	10	10	42	47	19	19	33	180
Actual Marks								

SECTION A SHORT QUESTIONS**QUESTION 1****MULTIPLE CHOICE****10 MARKS**

Various options are provided as possible answers to the following questions. Circle the correct answer (A–D) for each question.

1.1. Modular design of the motherboards means the following:

- A A socket to place the CPU in on the motherboard
- B A single unit where all the hardware is fixed
- C Components on the motherboard can be interchanged with other, provided they are compatible with the motherboard**
- D To plug a printer into a USB slot

1.2. Which word(s) describes a hardware component requesting attention from the CPU:

- A Serial Request
- B Interrupt**
- C Data Request
- D Data Range

1.3. A mechanism for improving the time it takes to read from or write to a hard disk:

- A Disk Cache**
- B Web Cache
- C Level 3 Caching
- D Level 2 Caching

1.4. Name the term for when the computer appears to run multiple programs at the same time.

- A Multiprocessing
- B Multithreading
- C Multi Cores
- D Multitasking**

1.5. The following is an example of a low level programming language

- A Assembler**
- B Pascal
- C Java
- D Python

1.6. In a class, which of the following indicates information hiding of the fields/properties.

- A Public
- B Constructor
- C Private
- D Integer

1.7. Connecting two devices via Bluetooth is an example of:

- A GAN
- B LAN
- C PAN
- D WLAN

1.8. Overclocking means the following:

- A The CPU operates faster than the system clock
- B The speed of the RAM is decreased to that of the CPU
- C Software runs at a faster rate than slower hardware components such as a hard drive, and data is written to the cache
- D All the components decrease their clock multiplication factor

1.9. The use of a server to store recently cached web sites for an organisation using a network.

- A Proxy Server
- B File Server
- C Email Server
- D Internet Server

1.10. Information overload can be defined as:

- A Websites that do not conform to any form of information privacy model
- B Collaboration in forming the content of the website
- C The amount of information is overwhelming and needs to be managed
- D Search engines that store information about the user doing the search

QUESTION 2**MATCHING COLUMNS****10 MARKS**

Write down along the left side of your page only the number of the question from Column A, and next to it the correct matching capital letter from Column B, for example 2.11 T.

Write down the answer at the bottom of the question in the space provided.

Column A		Column B
2.1.	Source code compiled into object code and creates a separate file	A Client side scripting B DNS C FTP D Record E Field F HTTP G Web 2.0 H Syntax Error I Compiler J Non-Atomic K Referential Integrity L Cookie M Data Redundancy N Run time error O Interpreter P Web 3.0 Q POP3 R Formal Parameter S ARP T IMAP U Actual parameter V Registers
2.2.	Protocol for converting a MAC address to an IP address	
2.3.	A text file that forms part of a web browser to record browsing history	
2.4.	The semantic or intelligent web	
2.5.	An error in programming where the program halts unexpectedly when executing	
2.6.	An email protocol where the emails are retained on the server available to multiple devices	
2.7.	Older protocol used to share files over the Internet	
2.8.	A collection of fields that contains details of a specific entity in a database	
2.9.	A parameter that is defined in a method header	
2.10.	A rule in the DBMS that no record can refer to a record that does not exist	

Write answers in the table below:

2.1	I	2.2	S	2.3	L	2.4	P	2.5	N	2.6	T	2.7	C	2.8	D	2.9	R	2.10	K
-----	---	-----	---	-----	---	-----	---	-----	---	-----	---	-----	---	-----	---	-----	---	------	---

SECTION B**SYSTEM TECHNOLOGIES**

CONSIDER THE SCENARIO BELOW WHEN ANSWERING THE REST OF THIS PAPER, ESPECIALLY SECTION B AND SECTION C

Scenario:

GATOX ENGINEERS employ engineers to work on remote building sites, in different cities. They need to take photos of current structures, calculate estimations for cost analysis, and write reports that includes the photographs taken of building sites. Furthermore, the engineers need to have access to their email and access to Internet for research purposes, on the building sites.

The engineers complete their reports at their head office. There are 50 people working in the office, these people include the engineers and their personal assistants.

The company wants to purchase computer products and have narrowed the search to the following two products:

Device A	Device B
	
Extracted: http://www.gsmarena.com/apple_ipad_pro-7562.php	Extracted: https://www.cnet.com/products/dell-inspiron-mini-10-10-1-atom-z520/specs/
CPU: Dual Core 2.26 GHZ, L3 Cache	CPU: Intel Atom Z520 2.33 GHZ L1 Cache
RAM: 4GB	RAM: 4 GB DDR3 SDRAM at 1 333MHz
GPU: PowerVR Series	GPU: None
Camera: 8MP Primary, 1.2MP Secondary	Camera: 2MP
Network: Wi-Fi, Bluetooth, LTE	Network: Wi-Fi, 100/1000 Ethernet
Sensors: Fingerprint, gyroscope, compass	Sensors: None
OS: IOS	OS: Windows Vista Home Edition
Storage: 128GB SSD	Storage: 1TB HDD
Card Readers: None	Card Readers: 3 in 1
Security Protocol Wi-Fi: WEP, WPA, WPA2	Security Protocol Wi-Fi: WEP, WPA

QUESTION 3

41 MARKS

3.1. Explain the term **Dual Core** processor. [2]

Two execution cores ✓ per physical processor ✓

3.2. Device B has a chipset found in traditional desktops.

3.2.1 Name the chipset component that is responsible for tasks that require the highest performance. [1]

Northbridge ✓

3.2.2 Name TWO components in Device B connected to this chipset. [2]

CPU, RAM ✓ ✓

3.3. Both devices contain cache memory in their CPU description. Explain the purpose of processor cache memory. [2]

Stores instructions and data frequently used by the CPU ✓ for high speed data access ✓

3.4 The CPU operates in a four step cycle.

3.4.1 List the FOUR stages of the machine cycle. [4]

fetch ✓, decode ✓, execute ✓, store ✓ OR transfer execute

3.4.2 Which two of these stages **will always** be executed for every instruction? [2]

Fetch ✓, decode ✓

3.4.3 Which TWO of these stages **will not always** be executed for every instruction? [2]

Execute ✓, store ✓

3.5 Device B has an Intel chipset.

3.5.1 The speed of the processor is 2.3 GHz while the speed of the RAM is 1 333 MHz. Explain why these components have different speeds. [2]

The CPU speed is determined by applying a clock multiplier to the FSB speed. ✓

Whereas the max RAM speed is determined by the FSB speed ✓

- 3.5.2 There are many bottlenecks in motherboard and chipset design. Explain TWO bottleneck that occurs and how it can be resolved. [4]

PCI bus – parallel transmission carried all IO for PCI devices and caused a bottleneck. ✓

Resolved by use of PCIe – individual serial channels✓

OR

Bottleneck between AGP port and NB✓

Resolved by PCIe – multiple channels can transmit data in both directions. ✓

Serial vs Parallel connect – Serial is much faster

OR

Memory bus contention – caused by CPU speed vs access of slower RAM

Resolved by more cache and multiple levels of cache being integrated on to the CPU chip

- 3.6 The two devices above have two different storage types. Explain TWO ways that Solid State hard Drives (SSD) can be distinguished from Hard Disk Drives (HDD). [2]

HDD store data magnetically – SSD stores data electronically ✓

SSD has no moving parts and is therefore more compact ✓

- 3.7 Device B could make use of Virtual Memory.

- 3.7.1. How is virtual memory implemented in Device B? [2]

Virtual memory is an area reserved on the HDD by the OS ✓and will be used to store pages swapped from RAM when RAM is full. ✓

- 3.7.2 Name one negative implication of using Virtual Memory [1]

Access to the HDD (VM) is slower, therefore it will slow down the operation of the CPU. ✓

- 3.8. Device A adds a GPU to the mobile device.

- 3.8.1. Explain the function of a GPU (do not expand the acronym). [2]

GPU is a dedicated graphics processor ✓used to render graphic images to the screen ✓

- 3.8.2. How would this component enhance the mobile device? [2]

By having the graphics processed by the GPU the CPU is free to attend to other processing functions. ✓ and will therefore increase the performance of the computer✓

3.9 The engineers need to choose between Device A and Device B.

3.9.1 Which device do you think that an engineer should choose? [1]

Device A

3.9.2. Give THREE reasons for your answer in 3.9.1 by referring to the components in the Device. [3]

8 MegaPixel camera – important for taking pictures on site ✓

Dual Core Processor will support tasks required✓

Separate GPU – Helpful for taking/playback of videos and highdefinition images✓

3.10 The Notebook uses a desktop operating system. Name two other types of desktop operating systems that do not include any Windows operating systems. [2]

Linux ✓

Mac OS / OS-X ✓

3.11 Name TWO utility applications that are available on any mobile device. [2]

Automatic software update

Security to logon

Power saving utility

3.12 An IT software design company has offered to write an application (program) for the engineers that will provide the functionality which they require. This application will use SAAS as part of the software.

3.12.1. Explain the term SAAS is (do not expand the acronym). [2]

Software-as-a-service is a cloud based software delivery model that provides access to software remotely as a web-based service. ✓The applications are not installed on the local PC. ✓

Pricing is based on a monthly fee rather than the purchase of a license ✓

3.12.2. List two examples of SaaS that the company could use. [2]

Web based e-mail ✓

Database processing – hosting of application and data so that it can be accessed easily. ✓

Office applications (eg Google Docs, Sheets etc.) ✓

SECTION C INTERNET AND COMMUNICATION TECHNOLOGIES

QUESTION 4

47 MARKS

4.1. GATOX ENGINEERS need to connect all devices in their head office with a local area network (LAN) and the Internet.

4.1.1. The choice of network connections inside the building is between **cables** and **Wi-Fi**. Why would a Wi-Fi connection be more suitable? Justify your answer by referring to the scenario. [2]

WiFi is more flexible for new devices to be added dynamically to the NW. ✓

Device A only has a WiFi connection. ✓

4.1.2. What additional device would you need to connect the Wi-Fi network to the Internet? [1]

router✓

4.1.3. Device A has LTE technology. What is LTE? [2]

4G ✓mobile communications standard✓

4.2. If GATOX ENGINEERS decide to build a network consisting of both cabled network and Wi-Fi, what suggestions would you make in respect of the following:

4.2.1. Which topology would you suggest for the cabled network, and give at TWO reasons why you would suggest this topology? [3]

Star✓

Easy to set up and maintain r✓

Easy to extend the NW r✓

Can add wifi-capability via a wifi-access point

4.2.2. The network requires a major component to connect all cabled devices together. Name this component. [1]

switch ✓

4.2.3. Fibre cable is expensive. Name a second disadvantage (not cost) of using fibre cabling. [1]

It is difficult to install – need technical skills ✓

4.2.4. The engineers located at remote building sites have heard of a wireless mesh network.

4.2.4.1. What is a wireless mesh network? [2]

The nodes are wireless✓ and communicate with each other and the users. Only one node needs to be physically wired to a NW connection. ✓

4.2.4.2. Would it be possible to use a Wireless Mesh Network to connect the remote sites to the LAN at head office? Justify your answer. [2]

NO. The WMN needs to connect to the LAN using a WAP that is cabled to a switch. Would need extra devices to add the WMN to the LAN. ✓ OR the WMN is an extension of a LAN – it is too far away.

4.3. In setting up a connection to the office, we would have to consider a router or a gateway.

4.3.1 Define a router. [2]

A device used to connect different networks✓ that can use the same protocols✓

4.3.2 Define a gateway. [2]

A gateway is a network point that acts as an entrance to another network. ✓

It can join two networks that use different protocols. ✓

4.4 GATOX ENGINEERS can use different solutions to connect the office to the Internet. The engineers and their personal assistants transmit pictures and reports. Why would ADSL be a good solution? Give two reasons for your answer considering the scenario. [2]

ADSL - cost effective, permanent✓ fast connection, up to 20Mbps✓

4.5 To connect to the Internet, data would need to be sent according to protocols.

4.5.1. Explain to management what a protocol is. [2]

A set of rules ✓for transmission of data across a NW✓

4.5.2 Name the protocol that we use to communicate on the Internet. [1]

TCP/IP ✓

4.6 Device A and Device B offer wireless connectivity. There is one type of connectivity that is the same on both devices and one type that is not the same.

4.6.1 Based on the scenario, and considering the network connectivity options, which device would you choose? [1]

Device A✓

4.6.2 Give TWO reasons for your choice in 4.6.1 [2]

It offers both LTE and WiFi connectivity✓

Security protocol WPA-2 is more secure✓

4.7 GATOX ENGINEERS want to save the photos and reports in the cloud.

4.7.1 Name TWO risks that the engineers need to consider when storing data in the cloud. [2]

Security ✓ rely on service provider to backup files

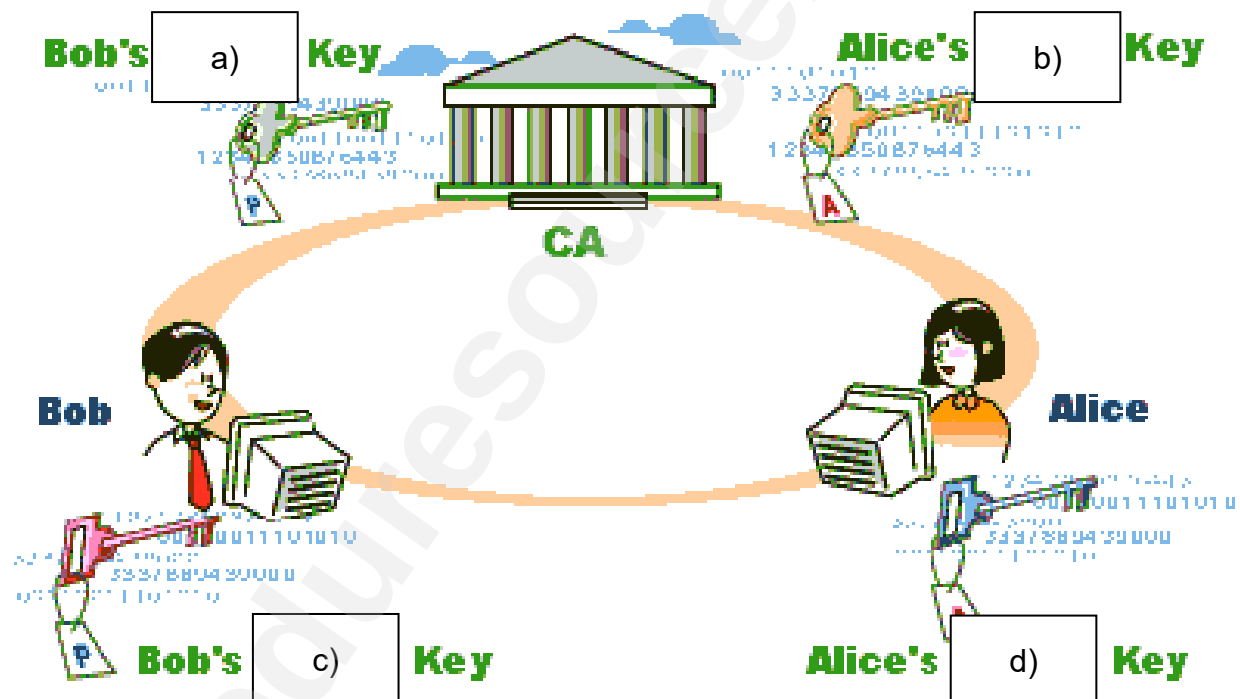
Long term viability of service provider ✓

4.7.2 Which Internet protocol must they use to transmit data in a safe and secure manner? Give one reason for your answer. [2]

HTTPS provides encryption of the data while being transferred ✓

4.8 The use of encryption is important if GATOX ENGINEERS want to secure the transmission of data over the Internet.

4.8.1 Label the following diagram a) – d) to illustrate how public and private key encryption works. [4]



a)	Public
b)	Public
c)	Private
d)	Private

- 4.8.2 The engineers at GATOX feels that the purchase of a digital certificate is unnecessary; give TWO reasons why this is a mistake. [2]

A digital certificate is necessary for them to be able to communicate and transfer data securely. It contains their public key so that people can send them encrypted messages ✓

It is issued by a certificate-issuing authority so any customers will be able to verify that the certificate is real ✓

- 4.9 One of the engineers is in a remote area with low Internet connectivity. He needs to show the staff a video. He could stream or download the video.

- 4.9.1 Define the terms streaming and downloading. [2]

Streaming Realtime delivery of media content to a receiving device, starting from the time that the media file is opened. The file is not saved to the device ✓

Downloading the transmission of a file from one computer system to another, usually smaller computer system ✓

- 4.9.2 Which of the options streaming or downloading would he use considering the scenario? Give ONE reason for your answer considering the scenario. [2]

Download ✓ – it may take a while to download but once saved on his device he will be able to view the video without interruptions ✓. Streaming with low connectivity will lead to poor viewing with intermittent delays.

- 4.9.3 Someone mentioned Bit Torrenting to the engineers as a method of getting the video file mentioned in 4.9.1. Would using Bit Torrenting be a good option for obtaining the video file? Give ONE reason for your answer considering the scenario. [2]

Yes ✓, Bit torrenting involves accessing files using peer-to-peer protocol. The file transfer load is shared between different PC so is quicker, ✓

OR No ✓ file searches and transfers from your computer to others can cause bottlenecks. ✓

- 4.10 One of the GATOX ENGINEERS needs to connect to the LAN at head office to access a file on the local server. The engineer can either use a VPN or Remote Access to connect to the LAN.

- 4.10.1 Which type of connection would you use? Justify your answer by describing the function of each connection method in this scenario. [5]

VPN – A VPN enables the user to logon onto the NW from a remote location ✓ with the same privacy and security as a LAN. ✓ The VPN connects via the internet. ✓ This will allow the user to access their files.

REMOTE ACCESS allows access to a PC or server from a remote location and will then be working directly on the PC accessed. ✓ Used mostly for remote support. ✓

SECTION D

QUESTION 5

19 MARKS

5.1. Managers in the office would like to educate their staff with regard to “fake news” found on social media sites.

5.1.1. How could Search Engine Optimisation be used to ensure that fake news is prioritised in the Search Engine? Name and describe TWO methods. [4]

Article spinning – use special software to make copies of article and repost as a new post to increase the rankings

Spam comments – generate spam comments on other sites that automatically link to the article – more links will increase the page ranking.

Include metadata with tags that will be picked up by search engine for multiple sites

5.1.2 On Facebook, one of the engineers read about a building falling down in Dubai. Describe three ways that you can identify if this is fake news. [3]

Check the source and visit the original site ✓

Cross check to reputable news sites ✓

Read the article carefully and assess type of language used, hyperbole etc ✓

5.2 Managers in the office also speak to their staff about the dangers of social networking and social engineering.

5.2.1 Which of the two are more dangerous? Justify your answer. [2]

Both can be harmful – any valid justification

Social media – inappropriate content, fake news, cyber bullying

Social engineering – info used to create false persona, access bank accounts etc

5.3 GATOX experience a loss of their data on their local file servers. They refer to a company specialising in detecting weaknesses in the computer networks.

5.3.1 Would a black hat hacker or white hat hacker be used to expose the weaknesses in the GATOX computer system? Justify your answer. [2]

White hat hacker – uses hacking skills to test and assess security ✓ and expose any vulnerabilities. ✓

5.3.2 How could a Denial of Service attack affect GATOX ENGINEERS? [2]

A Denial of Service attack could prevent the users from having access to their ✓ systems as the attack would flood the system and effectively shut down the NW.

The attacker may be able to destroy or change data as well. ✓

5.4. One of the staff members at GATOX ENGINEERS admitted to deleting the files relating to customers and their building designs and emailing files to a company in competition to GATOX. Would the management at GATOX have the right to search through all the emails of the employee?

5.4.1. Would the management at GATOX have the right to search through the emails of the staff member? Give TWO reasons for your answer. [3]

Yes ✓ – this would be governed by the AUP that has been put in place by the company ✓ which would give the company the right to search the emails in the event of a discipline issue. This would have been signed by the employee ✓

5.4.2 Would encrypting the files have prevented the staff member from deleting the files? Justify your answer. [3]

No ✓ – if he had access ✓ to them he would still have been able to delete them ✓

The encryption would have provided security against the competitor being able to read them

SECTION E DATA AND INFORMATION MANAGEMENT AND SOLUTION DEVELOPMENT

QUESTION 6

DATABASES

20 MARKS

Background:

R = Residential House

tblCustomers

CustID	Customer Name	PropID	Property GPS Coords	Type	Residential/ Commercial	Number Stories	Address
001	Guy Prop	GP001	26.204158 S 28.047312 E	C	Commercial	5	14 Joubert Street JHB
001	Guy Prop	GP002	26.204156 S 28.047322 E	C	Commercial	6	55 Fox Str JHB
002	Glen Sec	GP002	26.204156 S 28.047322 E	C	Commercial	6	55 Fox Str JHB
002	Glen Sec	FS001	29.08512 S 26.159634 E	C	Commercial	2	34 Clyde Ave BFN
003	Silver Star	WC001	33.924977 S 26.159622 E	R	Residential	2	3 Summer Place CT
003	Silver Star	GP003	26.204160 S 28.047322 E	C	Commercial	1	134 Jorrisen Str JHB
005	Anderson Clay	WC001	33.924977 S 26.159622 E	R	Residential	2	3 Summer Place CT
005	Anderson Clay	GP004	26.204199 S 28.047334 E	R	Residential	3	56 Grayston Ave JHB

6.1. This database is poorly designed which will lead to errors and anomalies in the database.

6.1.1. Give an example of each type of anomaly from the table above.

[3]

Update:
If Guy Prop changed there name to Guy Prop PTY it would need to be changed in multiple places. ✓
Insert:
Cannot add a new customer unless you have all the property details as well✓
Delete:
If you delete Property ID GP004 you will lose all the details for Anderson Clay✓

6.2 Provide an example of derived data using the table.

[2]

Residential / Commercial ✓derived from the type R/C✓

6.3 The field **Property GPS Coords** could be considered non-atomic data. Do you think the field should be split into two separate fields? Justify your answer.

[2]

Yes —✓ if it is split into latitude and longitude it is easier to search on the individual fields.
✓

6.4 Normalise the table to Third Normal Form (3NF). When writing the relation make use of Relational Notation: TableName (Field01, Field02, Field03 ...). Remember to underline the primary keys.

[8]

Customers✓ (CustID, ✓ Name)

Properties✓ (PropID, ✓Property GPS Coords, Type, Number Stories, Address) I mark for removal of Residential/Commercial field✓

CustProp✓ (CustID✓, PropID) ✓

6.5 The Architect's name is missing from the table. Note that an architect may design more than one building, but not all the buildings are designed by the same architect.

How would you expand the solution to include this field? Could you add this field to the existing table or would you need to add a new table? Give a reason for your answer.

[2]

One to many relationship extra table for architects details✓ with a key in the Property table✓

6.6 When using SQL to query a database, a LEFT JOIN and an INNER JOIN are often confused when combining tables. Explain the difference between these two joins.

[2]

A LEFT JOIN will create a new record in the RESULTSET for all records in the LEFT table and will insert NULLS for missing field in the table being joined to. ✓

An INNER JOIN will only create records in the RESULTSET where it finds a match between the two tables✓

QUESTION 7**OOP****33 MARKS**

GATOX ENGINEERS go out to building sites and work out cost estimates, give building advice, research building techniques and write reports. The customer is billed according to the time the engineer spent on site.

- 7.1 Write an algorithm that will determine the cost to bill a customer for the work done by an engineer for a month. The input of data is the hourly rate of pay for the engineer, followed by a sequence of numbers representing the number of hours worked for each day. Input will stop when the engineers enters 555 for hours worked. An engineer can only work 8 hours a day, so any number larger than 8 must be charged overtime which is 1.5 times greater than the hourly rate.

Input example:

400.00, 5, 9, 7, 1, 2, 7, 10, 555.

The output should include the total normal hours worked (excluding 555) multiplied by the hourly rate, the total number of overtime hours multiplied by the hourly rate x 1.5, the number of days entered and the calculated amount to charge the customer.

Output using the above data:

Total hours at normal time = 38 x 400.00 = 15200.00

Overtime hours at overtime rate = 3 x 600.00 = 1800.00

Total pay = 17000.00

Number of Days = 7

[14]

```

input rate ✓
days ← 0  initialise variables
overtime ← 0
normalhours ← 0
input hours ✓
while (hours NOT = 555) ✓
    days ← days + 1 ✓
    if (hours > 8) ✓
        normalhours ← normalhours + 8 ✓
        overtime ← overtime + (hours-8) ✓✓
    else
        normalhours ← normalhours + hours ✓
    endif
    input hours ✓
endwhile
normalpay ← normalhours x rate ✓
otpay ← overtime x rate x 1.5 ✓
output "Total hours at normal time = " normalhours "x" rate "=" normalpay
output "Total hours at over time = " overtime "x" (rate x 1.5) "=" otpay ✓
output "Total pay = " (normalpay + otpay)
output "Number of days = " days ✓

```

7.2 A class has been created to store the information of an invoice.

Invoice Class
Properties - String EmployeeNumber - String ClientNumber - double monthlyCost - Final double VAT = 14
Methods + setEmployeeNumber(String e) + getEmployeeNumber():String + addVAT():double + toString():String

7.2.1 Write down an **accessor** and **mutator** method using the class diagram.

[2]

Accessor : getEmployeeNumber ✓

Mutator : setEmployeeNumber✓

7.2.2 Explain why the VAT field is declared as final. [2]

It is being declared as a CONSTANT value ✓as this value should not be altered by any of the methods. ✓

7.2.3 The class is missing the constructor method. Write down the method header of the parameterised constructor method. [4]

public Invoice ✓ (String emp, String client, double mc); ✓✓✓

7.2.4 The **EmployeeNumber** field consists of six characters. The first two consist of the employees initials, and the next three must be digits with the last being an E for an engineer. For example AB042E, JK201E.

Write a method in Java to determine if the **EmployeeNumber** is valid. The first two characters should be letters, the next three should be numbers and the last character should be an 'E'. The method should terminate as soon as the **EmployeeNumber** is determined to be invalid.

You may assume all the letters will be capitals.

The method is called by boolean ans = checkEmployee(String empNo); [8]

```
boolean checkEmployee (String s) ✓
{
    for (int i = 0; i <= 1; i++) ✓
    {
        if (Character.isLetter (s.charAt(i)) == false) ✓
            return false; ✓
    }
    for (int i = 2; i <= 4; i++) ✓
    {
        if (Character.isDigit (s.charAt(i)) == false) ✓
            return false;
    }
    if (s.charAt(5) != 'E') ✓
        return false;
    else return true; ✓
}
```

7.3 An array is created to store multiple Invoices with the following declaration:

```
Invoice [] iArr = new Invoice[100]
```

Would it be suitable to store the VAT field in each Invoice class? Justify your answer. [3]

NO✓ As the VAT field can only be referenced and not altered ✓it is not necessary to store a VAT field in each Invoice OBJECT. ✓

OR

The field should be declared as static✓ and then only one field will be stored for the class which can then be accessed by all of the objects. ✓

OR

The VAT field will be copied✓ for each array element wasting memory space. ✓

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