NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2024

INFORMATION TECHNOLOGY: PAPER II

MARKING GUIDELINES

Time: 3 hours 150 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

SECTION A SHORT QUESTIONS

QUESTION 1 DEFINITIONS

1.1 SRAM

1.2 SATA

1.3 Fetch

1.4 Modular design

1.5 ALU (Arithmetic Logic Unit)

1.6 Topology

1.7 Wireless bridge (Accept Bridge)

1.8 IMAP

1.9 Lossless

SECTION B SYSTEM TECHNOLOGIES

QUESTION 2 THEORY

2.1 D

2.2 O

2.3 F

2.4 E

2.5 N

2.6 I

2.7 H

2.8 J

2.9 M

2.10 A

QUESTION 3 APPLICATION

3.1 3.1.1 A computer on a network which has minimal processing and local storage capabilities.

3.1.2 Quad core means that there are four independent processing units within the one physical CPU.

3.1.3 (a) Overclocking is a process whereby a component is made to operate at a rate faster than it was intended to.

(b) TRUE

(c) Per component: a single component, e.g. a CPU, has its speed increased, whole system: the entire system, all components, are run at a faster clock speed.

(d) Possible answers:
- To reduce power consumption.
- Extend the life of components.
- Reduce heat.

Any TWO correct options

3.2 3.2.1 Example answer:

Clients	Suggested server RAM	Justification
5 admin	40 GB	Each requires 8 GB
20 staff/student	160 GB	Each requires 8 GB
Server needs	8 GB	Minimum for the server to operate.
TOTAL	208	

5 Admin – has to be 5 × 8 GB.
20 staff/student – has to be 20 × 8 GB.
Justification for these two – relates to the requirement of question.
Server needs – accept any realistic suggestion from the candidate: must be at least 8GB+ with justification.

3.2.2

Total RAM (from 3.2.1)	208
Number of 32GB chips	208/32 = 6,5 becomes 7
Total installed RAM	224 GB

NB: For the calculation of the number of chips, the first mark is allocated for the calculation. Should the candidate get this wrong, the second mark can still be awarded, provided it is a correct rounding up for the answer which the candidate obtained.

3.3 3.3.1 TRUE

3.3.2 Kernel

3.3.3 (a) Virtual memory is where a part of permanent storage (disk storage) is used to extend the amount of RAM available by temporarily storing the contents of RAM to disk.

(b) YES.
There will be an added demand on the CPU to manage the data being moved between the drive and RAM **OR** access will be much slower due to the need to fetch data from the hard drive.

3.4

Software Item	Device 1	Device 2	Both devices	
Spreadsheet	Yes	No		
Justification	A spreadsheet will run locally on Device 1 but will be served to Device 2 over the network.			
Software Item	Device 1	Device 2	Both devices	
Browser			Yes	
Justification	Both devices are likely to need a browser: device 1 will use it like any other computer, all applications are likely to be delivered to device 2 via a browser.			

Mark allocation: one mark for the yes/no, one mark for justification. Second mark (justification) can only be awarded if the justification is valid, if no justification given, no mark for the yes/no.

SECTION C INTERNET AND COMMUNICATION TECHNOLOGIES

QUESTION 4 THEORY

Question	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10
Answer	**B**	**C**	**D**	**D**	**B**	**C**	**B**	**D**	**B**	**A**

QUESTION 5 APPLICATION

5.1 5.1.1 Mb/s (Megabits per second)

5.1.2 YES
There will be significant network traffic between the thin client and the server. Having the port operate at the higher speed (1 000 Mb/s) will be advantageous in terms of performance.

5.2 5.2.1 Possible answers:
- Speaker
- Headphones
- Mouse
- Graphics tablet
- Mobile phone

Accept any TWO valid devices

5.2.2 Must use the two devices from Question 5.2.1 and must show a valid connection option.

Possible example connections:
- USB
- Wi-Fi (via a wireless router)
- Ethernet (LAN port)

Any TWO valid different connection options for the peripheral selected

5.3 5.3.1 Fibre
Valid reasons: distance (>100 m which is UTP limit); transmission speed, bandwidth (single UTP connection might not be sufficient, depending on the number of clients installed in the new location.
Any TWO valid reasons

5.3.2 (a) A wireless transceiver.
(Accept transmitter/wireless access point)

(b) Two would be needed. One will need to be placed on main (original) building, and one on the new building.

(c) By connecting to a switch port.

5.4 5.4.1 Reason 1: to recover from data loss as a result of hardware failure.

Reason 2: to avoid extra work in capturing data again if any is lost/ deleted.
Accept any TWO valid options.

5.4.2 Backup drive shouldn't be in the same location as the actual data, if the server is corrupted with a virus, the backup will be affected as well.

Any TWO valid reasons – focus is that the backup must be in a different location/should not be directly linked to the server.

5.4.3 Option 1: A backup device in another location on the campus, not in the server room. E.g.: in the new music block. This is better because if there is a fire in the server room, the backup will be safe in another venue.

Option 2: Cloud backup. This is better as the backup is off campus, and unlikely to be affected by any disasters on campus.

Any TWO valid options. Focus is for the backup to NOT be in the same room as the server, or directly linked to it.

5.4.4 Frequency: at least once a day. Explanation must align with the frequency. Less than once a day is not acceptable. Items to look for: data being updated all the time, student info on a database etc, staff/student work being done, can't lose this, must be backed up regularly; be able to assist with accidental deletion of files.

5.4.5 (a) TRUE

(b) RAID warns of possible hardware failure OR any attempt to explain how data can be reconstructed from existing data written to other disks.

(c)

RAID level	Implementation
RAID 1	Mirroring
RAID 5	Striping

(d) They will need to restore data from the most recent backup once new drives are installed.

5.4.6 Reason 1: Only doing full backups will require a lot of disk space.

Reason 2: Incremental backups require less time to complete than full backups because there is less data being transferred.

SECTION D SOCIAL IMPLICATIONS

QUESTION 6

6.1

Shoulder surfing	How used:
	The person wanting to get info stands close to someone else and watches over their shoulder while they work, tries to watch for passwords, etc.
	Prevention:
	Staff should make sure no students are close to them while they are using their computers, especially when logging in.
Dumpster diving	How used:
	Fraudsters will literally go through rubbish which is put out for collection to try and find any useful information about a person or organisation they are trying to get into.
	Prevention:
	True Learn should ensure that any paper which might have sensitive information on it is shredded before disposal or burned.
Phishing	How used:
	Fraudsters will send an official-looking email to someone prompting them to click on a link to a fake site where they are asked to enter personal details which can then be collected and used.
	Prevention:
	True Learn should have an education program for staff and students, teaching them what to look out for, how to identify fake emails.

6.2 6.2.1 Cyberbullying is sending, posting, or sharing negative, harmful, false content about someone else, intending to harm them mentally or cause embarrassment.

6.2.2 Accept any TWO valid options:
- Instagram
- Facebook
- Snapchat
- Youtube

6.2.3 Accept any TWO valid answers:
- Provide a support service.
- Help them collect evidence for prosecution.
- Assist with changing security settings.
- Help to block and report the bully.

6.2.4 Cyberbullying is unseen, easier for someone to hide the fact they are being cyberbullied – focus is on anonymity. BUT there are electronic trails.

6.3 Affiliation; Authority; Currency; Objectivity plus valid explanation: e.g.: authority – who is the author of the web content – qualifications, etc., Currency – when was the info last updated? for technique, for explanation

SECTION E DATA AND INFORMATION MANAGEMENT AND SOLUTION DEVELOPMENT

QUESTION 7

7.1 7.1.1 Any TWO correct options:

- Assist with understanding the relationships between objects.
- Helps understand the functionality of the overall project.
- Provides a visual representation of the project.
- Simplifies the complexity of a project.

7.1.2

Order
Fields: -name : string #snack : integer #drink : integer #totalCost : real + SNACKCOST = 5,50 : real + DRINKCOST = 10,00 : real
Methods: +Constructor (n:string, s: integer, d:integer) +getSnack() : integer +getDrink() : integer +setName(n: string) +calculateCost() : double +toString() : string

TeacherOrder
Fields: -takeAwayMeal : integer + TAKEAWAYCOST = 30,00 : double
Methods: +Constructor(n:string, s: integer, d:integer, tAM: integer) +getTakeAwayMeal() :integer +calculateCost() : double +toString() : string

Mark allocation:
Order class:
for one private and three protected fields
for two public static fields correctly typed and correct assignments
for Constructor with all correct parameters correctly named and typed
for all setters and getters- all correct
for calculateCost() and toString(), named and typed correctly

Teacher Order class:
for correct access modifiers for both fields (takeaway meal and TAKEAWAYCOST)
for Constructor with extra parameter
for inheritance relationship shown (correct arrow, correct direction)

–1 if candidate has included totalCost in either Constructor

7.1.3 (a)

Characteristic one	They are declared as static
Characteristic two	They are declared as final/constant

(b) Because they are declared as final, they cannot be changed from another class. They are shared by all objects.

(c) Because if the price of the food item changes, you will not be able to easily change the price in the program code, unless you have access to the source code. Accept answers which show thinking around the fact that prices of food items fluctuate for many reasons.

(d) (i) Void method: does something, a calculation, manipulates data, but does not return a value.

Typed method: same as a void method but will return a value of a particular type.

(ii) The calculateCost() method in the parent class could be called as part of the calculation **OR** reuse the calculateCost method from the Order class

Also accept if candidate writes out the following code:
super.calculateCost() + (takeAwayMeal * TAKEAWAYCOST)

7.1.4 (a) Order

(b) The structure which will store objects of two types (child/parent) needs to be defined of the parent type because the parent type has all the original fields and methods which the child class adds to.

(c) Java: if (oArr[size] **instanceof TeacherOrder**) **OR**
Delphi: if oArr[size] **is TTeacherOrder** then

7.1.5 Neither is correct.
Overloading is where two or more methods in the same class share the same name but have different parameter lists. Overriding is where the method signatures are the same in both a parent and child class. The two constructor methods have the same name in a child/parent relationship BUT the signatures are different.

7.2 7.2.1

Line	count	total	countS	countD	temp	k	countS > countD ?	Return
1	5							
2		0						
3			0					
4				0				
5					" "			
6						0		
7			1					
8				3				
9		4						
6						1		
7			2					
8				4				
9		6						
6						2		
7			4					
8				5				
9		9						
6						3		
7			6					
8				7				
9		13						
6						4		
7			9					
8				9				
9		18						
10							FALSE	
12					More drinks than snacks sold			
13					More drinks than snacks sold Total sold 18			
14								More drinks than snacks sold Total sold 18

Mark allocation:

for all initial values correct: lines 1, 2, 3, 4, 5
for line numbers present
for loop pattern in line numbers (6, 7, 8, 9)
for countS and countD columns correct
for condition FALSE
for k column correct (0,1, 2, 3, 4)
for total column correct
for correct line 12
for concatenation (line 13) and return (line 14). If candidate has incorrect concatenation but includes this into the return statement, allow the mark.

7.2.2 (a) Snacks: 9 Drinks: 9

(b) The if …. Else … needs to include an option for if the number of snacks and drinks sold are the same. Currently it only caters for one being bigger than the other.
Accept: Change the output line to indicate both are the same.

(c) String.

7.3

S	D	T	(S.D)	(D.T)	(S.D) + (D.T)	(S.T)	(S.T)+D	((S.D) + (D.T)) + (S.T+D)	RESULT True/False
0	0	0	0	0	0	0	0	0	F
0	0	1	0	0	0	0	0	0	F
0	1	0	0	0	0	0	1	1	T
0	1	1	0	1	1	0	1	1	T
1	0	0	0	0	0	0	0	0	F
1	0	1	0	0	0	1	1	1	T
1	1	0	1	0	1	0	1	1	T
1	1	1	1	1	1	1	1	1	T

Mark allocation:
for **(S.D)**
for **(D.T)**
for **(S.D) + (D.T)**
for **(S.T)**
for (S.T)+D
for ((S.D) + (D.T)) + (S.T+D)
for result column: T/F matches to previous column.

Total: 150 marks