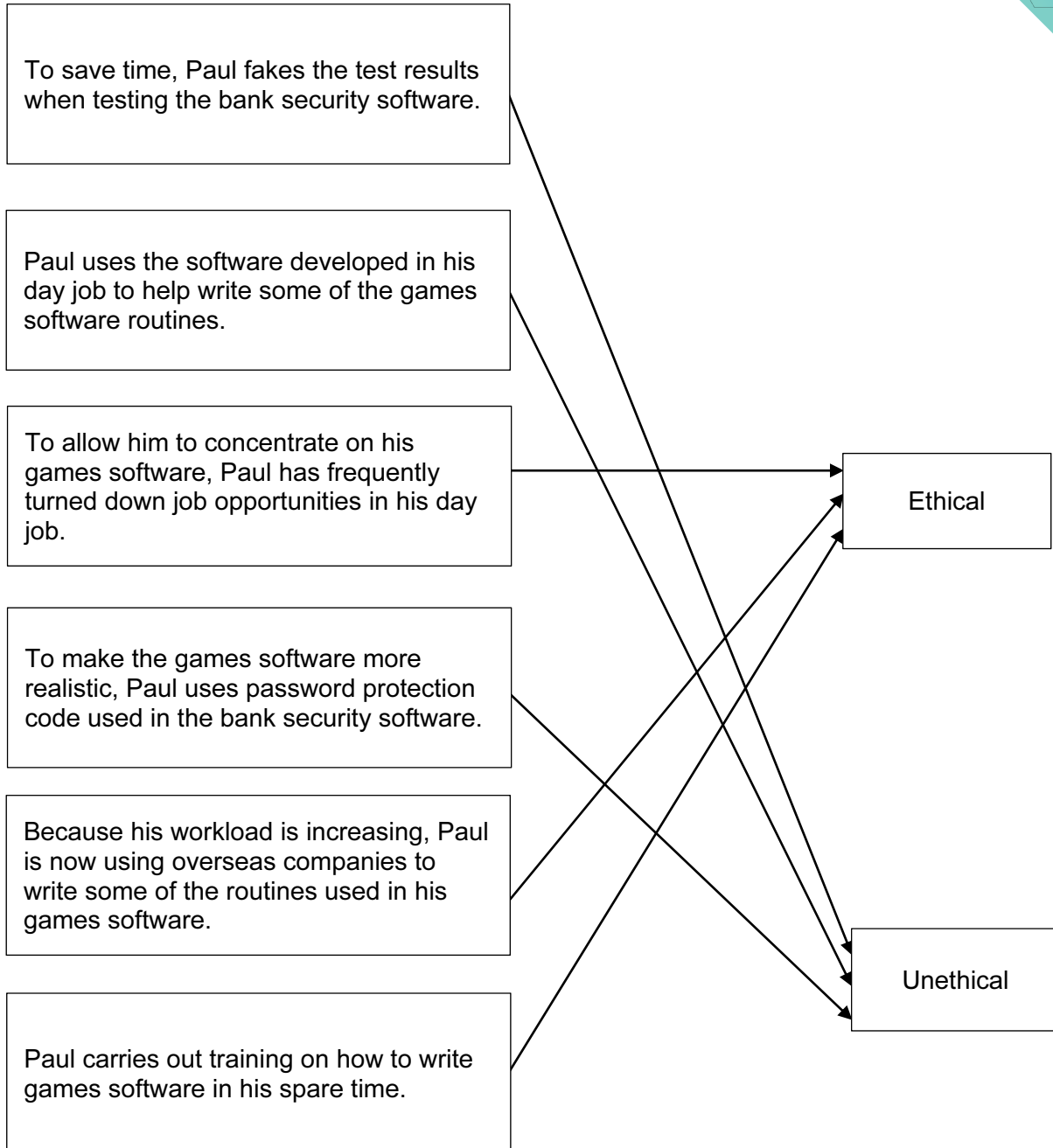


QUESTION 1.



4



1 mark for each correct line, two lines from one box is incorrect

[6]

QUESTION 2.



- 6 **One mark** for identifying the principle, **one mark** for an example that is in the context of the scenario.

Maximum of two marks per principle. **Maximum of three** principles.

- PUBLIC / Software engineers shall act consistently with the public interest.
 - Example in context
- CLIENT AND EMPLOYER / Software engineers shall act in a manner that is in the best interests of their client and employer (consistent with the public interest.)
 - Example in context
- PRODUCT / Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.
 - Example in context
- JUDGEMENT / Software engineers shall maintain integrity and independence in their professional judgment.
 - Example in context
- MANAGEMENT / Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
 - Example in context
- PROFESSION / Software engineers shall advance the integrity and reputation of the profession (consistent with the public interest).
 - Example in context
- COLLEAGUES / Software engineers shall be fair to and supportive of their colleagues.
 - Example in context
- SELF / Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.
 - Example in context

QUESTION 3.

Cambridge
International
AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level



COMPUTER SCIENCE

9608/11

Paper 1 Written Paper

October/November 2017

MARK SCHEME

Maximum Mark: 75

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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This document consists of **7** printed pages.



Cambridge Assessment
International Education



Question	Answer									
1(a)(i)	119									
1(a)(ii)	−120									
1(a)(iii)	<table border="1"><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table>	1	1	1	0	1	1	1	1	
1	1	1	0	1	1	1	1			
1(a)(iv)	Lowest value: −128 Highest value: +127	1								
1(b)(i)	0110 0101 0011	1								
1(b)(ii)	The second block of four binary digits represents a digit larger than 9 // 14	1								
1(b)(iii)	A string of digits on any electronic device displaying numeric values	1								

Question	Answer	Marks
2(a)		4
2(b)(i)	One mark from: - The program code can be translated to run on any processor / platform - Source code is translated into machine independent intermediate code not machine dependent code	1



Question	Answer
2(b)(ii)	Two marks from: • Java uses a two-step translation process • Java code is partially interpreted – partially compiled • Code is translated first into intermediate code / "bytecode"... • ...using the Java compiler • The bytecode is finally interpreted by the Java Virtual Machine

Question	Answer	Marks																																													
3(a)	Two marks from: - Physical measures - Access rights - Encryption - Firewall - Use authentication methods such as usernames and passwords - Anti-malware program	Max 2																																													
3(b)(i)	<table border="1"><tr><td>7</td><td>X</td><td>6</td><td>=</td><td>42</td></tr><tr><td>8</td><td>X</td><td>5</td><td>=</td><td>40</td></tr><tr><td>6</td><td>X</td><td>4</td><td>=</td><td>24</td></tr><tr><td>5</td><td>X</td><td>3</td><td>=</td><td>15</td></tr><tr><td>3</td><td>X</td><td>2</td><td>=</td><td>6</td></tr><tr><td>1</td><td>X</td><td>1</td><td>=</td><td>1</td></tr><tr><td></td><td></td><td></td><td>Total:</td><td>128 / 11</td></tr><tr><td></td><td></td><td></td><td></td><td>11 R 7</td></tr><tr><td colspan="4">Check digit:</td><td>11 – 7 = 4</td></tr></table> 1 mark for 6 values 1 mark for 2 steps Accept 128 MOD 11 = 7 1 mark for subtraction Answer: 786531 4 (1 mark for answer)	7	X	6	=	42	8	X	5	=	40	6	X	4	=	24	5	X	3	=	15	3	X	2	=	6	1	X	1	=	1				Total:	128 / 11					11 R 7	Check digit:				11 – 7 = 4	4
7	X	6	=	42																																											
8	X	5	=	40																																											
6	X	4	=	24																																											
5	X	3	=	15																																											
3	X	2	=	6																																											
1	X	1	=	1																																											
			Total:	128 / 11																																											
				11 R 7																																											
Check digit:				11 – 7 = 4																																											
3(b)(ii)	One mark for name of check One mark for description Max two checks Uniqueness check Each PatientID must be unique Length check Each PatientID is exactly 7 characters Format check / Type check All 7 characters must be <u>digits</u> Presence check PatientID must be entered	Max 4																																													



Question	Answer																															
4(a)	A – System clock B – Control unit C – Main memory E – Control bus F – Data bus																															
4(b)	<table border="1"> <thead> <tr> <th>ACC</th><th>CountDown</th><th>OUTPUT</th></tr> </thead> <tbody> <tr> <td></td><td>15</td><td></td></tr> <tr> <td>67</td><td></td><td>C</td></tr> <tr> <td>15</td><td></td><td></td></tr> <tr> <td>14</td><td>14</td><td></td></tr> <tr> <td>51</td><td></td><td>3</td></tr> <tr> <td>14</td><td></td><td></td></tr> <tr> <td>13</td><td>13</td><td></td></tr> <tr> <td>32</td><td></td><td></td></tr> <tr> <td>88</td><td></td><td>x</td></tr> </tbody> </table> (1) (1) + (1) (1) (1)	ACC	CountDown	OUTPUT		15		67		C	15			14	14		51		3	14			13	13		32			88		x	5
ACC	CountDown	OUTPUT																														
	15																															
67		C																														
15																																
14	14																															
51		3																														
14																																
13	13																															
32																																
88		x																														
4(c)	Three marks from: - The assembler scans the assembly language instructions in sequence - When it meets a symbolic address checks to see if already in symbol table - If not, it adds it to the symbol table in the symbolic address column - If it is already in symbol table check if absolute address known - If the absolute address is known, it is entered in the appropriate cell - If the absolute address is not known mark / leave as unknown	Max 3																														
4(d)(i)	The op code / mnemonic / instruction table	1																														
4(d)(ii)	A – 1110 0110 0110 1000 (1) (1) B – E6 68 (1)	3																														



Question	Answer	
5(a)(i)	Three marks from: • Diaphragm / cone • (Voice) coil of wire • Spider / Suspension • (Permanent) Magnet • Basket • Dust cap • Outer frame	
5(a)(ii)	Four marks from: • Takes an electrical signal and translates it into physical vibrations to create sound waves • An electric current in the coil creates an electro-magnetic field • Changes in the audio signal causes the direction of the electric current to change • The direction of the current determines the polarity of the electro-magnet // changing the direction of the current changes the direction of the polarity of the electro-magnet • The electro-magnet is repelled by or attracted to the permanent magnet • Causing the coil to vibrate • The movement of the coil causes the cone / diaphragm to vibrate • That vibration is transmitted to the air in front of the cone / diaphragm as sound waves • The amount of movement will determine the frequency and amplitude of the sound wave produced	Max 4
5(b)(i)	One mark from: • External hard disk drive // SSD • External CD / DVD drive • Pen drive • Blu-ray drive	1
5(b)(ii)	Two marks from: • Additional secondary file storage // storing files • Backup of files • Archiving of files • Transfer files to second computer	Max 2



Question	Answer	
6(a)	Two marks from: - A system of moral principles - That guide behaviour / decision making - Based on philosophical / religious views - By example, e.g. respectful and considerate behaviour	
6(b)	One mark for identifying the issue One mark for correct principle One mark for possible action Max 2 issues (2 × 3 marks) 1 Uncomfortable with one of his colleagues Client and Employer // Management / Colleagues // Judgement // Self For example: Team building exercises // arranged meeting 2 Unfamiliar with programming language Self // Client and Employer // Product // Profession // Colleagues For example: Undergo training 3 Visit to unfamiliar workplace Client and employer // Management // Judgement // Profession // Colleagues For example: He should speak to his manager to discuss situation	Max 6

Question	Answer	Marks
7(a)(i)	<u>PatientID</u> } <u>DoctorID</u> } (1) <u>AppointmentDate, AppointmentTime</u> (1)	2
7(a)(ii)	<pre> graph TD PATIENT <--> DOCTOR PATIENT --> APPOINTMENT DOCTOR --> APPOINTMENT </pre> One PATIENT attends many APPOINTMENTs One DOCTOR takes many APPOINTMENTs Special case for 1 mark only (only if no one to many relationships shown) Many PATIENTs are seen by many DOCTORs	2



Question	Answer	
7(b)	Two marks from: Either: - Add an attribute (for example <code>Attended</code>) - To the appointment table // <code>APPOINTMENT</code> Or: - Add an attribute (for example <code>AppointmentsMissed</code>) - To the patient table // <code>PATIENT</code>	
7(c)(i)	Available to work at both <code>SITE-A</code> and <code>SITE-B</code>	1
7(c)(ii)	<code>APPOINTMENT(Site, AppointmentDate, AppointmentTime, DoctorID, PatientID)</code>	1
7(d)(i)	One mark per line <code>UPDATE DOCTOR</code> <code>SET DoctorID = '017'</code> <code>WHERE DoctorID = '117';</code>	3
7(d)(ii)	1 Mark per bullet, max 2 - Referential integrity should be maintained // Referential integrity could be violated. - Data becomes inconsistent - There may be records in the <code>APPOINTMENT</code> table showing doctor ID 117 - The <code>APPOINTMENT</code> table might not be automatically updated - Records in the <code>APPOINTMENT</code> table will become orphaned	Max 2
7(e)	One mark per line <code>SELECT AppointmentDate, AppointmentTime</code> <code>FROM APPOINTMENT</code> <code>WHERE PatientID = '556';</code>	3

QUESTION 4.



Question	Answer	
5	<pre> graph LR A[Incident A] --> Ethical A --> Public B[Incident B] --> Ethical B --> Self C[Incident C] --> Unethical C --> Product D[Incident D] --> Ethical D --> Profession E[Incident E] --> Unethical E --> Management F[Incident F] --> Ethical F --> Colleagues </pre> The diagram illustrates the ethical classification of six incidents (A-F) based on their impact on various stakeholder groups. The incidents are categorized as either Ethical or Unethical, and each is linked to one or more stakeholder groups: Public, Client & Employer, Product, Judgement, Management, Profession, Colleagues, and Self.	
5(a)	Mark as follows: Unethical: C and E 1 Mark Ethical: A,B, D and F 1 Mark	2
5(b)	Mark as follows: A – Public interest 1 Mark B – Self 1 Mark D – Profession 1 Mark F – Product 1 Mark	4

QUESTION 5.



Question	Answer	
5(a)	1 mark per bullet point for each justification, to max 2 Either Unethical • Work belongs to the company it was created for // copyright • ... Kevin cannot use it without permission • It reduces the integrity of the person / profession / new company • Reference to IEEE standards <u>in context</u> Or Ethical • The program code could be open source • Kevin might own the copyright of code • Kevin may have permission to use the code • Reference to IEEE standards <u>in context</u>	
5(b)	1 mark per bullet point for each justification, to max 2 Either Unethical • Nadya has accepted a role / work she knows she cannot do • This reduces the integrity of the person • She may let down the new organisation who are expecting her to be able to do the work • Reference to IEEE standards <u>in context</u> Or Ethical • She is taking steps to prepare for the role • ... Without expecting the company to do it • Nadya may have told the company that she didn't know the languages but that she would learn them • Reference to IEEE standards <u>in context</u>	2
5(c)	1 mark per bullet point for each justification, to max 2 Either Ethical • The individual works as part of the team ... • ... therefore, the team should / will get the credit • Maria is not lying about who produced it • Reference to IEEE standards <u>in context</u> Or Unethical • Maria should identify who / where the idea originated • It prevents the individual getting recognition • Maria is not being supportive of the individual • Reference to IEEE standards <u>in context</u>	2

QUESTION 6.



Question	Answer	Marks
5(a)	1 mark per bullet point for each justification, to max 2 Either Unethical • Noah's work may be confidential • Wendy shouldn't claim someone else's ideas / work as her own • She is bringing the profession into disrepute • Reference to IEEE standards <u>in context</u> Or Ethical • The code could be open source • Wendy may have permission from Noah • Wendy isn't copying the code, just getting ideas • Reference to IEEE standards <u>in context</u>	2



Question	Answer	
5(b)	1 mark per bullet point for each justification, to max 2 Either Unethical • Amit has a responsibility to his company • He should have taken it to the police rather than putting it on the Internet • He has a signed agreement to say he will not give anything away • Reference to IEEE standards <u>in context</u> Or Ethical • Amit is acting in the public interest • Amit may not have actually signed the confidentiality agreement • If acting illegally, the multinational company should be brought to justice • Reference to IEEE standards <u>in context</u>	
5(c)	1 mark per bullet point for each justification, to max 2 Either Ethical • It might save people's jobs • Farah is acting in the best interest of her company • Reference to IEEE standards <u>in context</u> Or Unethical • Farah has a responsibility to act in the best interest of her client • It could give her company a bad reputation • Reference to IEEE standards <u>in context</u>	2



Question	Answer	
3(a)	Either Ethical • He is booking the holiday in his own time / lunchtime // he is self-employed • He has been given permission • Reference to IEEE <u>in context</u> Or Unethical • Should not use company computer for personal use • Should be working whilst at work • Reference to IEEE <u>in context</u>	
3(b)	Unethical: Max 2 marks from • Company will get a bad reputation • Should be supporting his colleague • Reference to IEEE <u>in context</u>	2
3(c)	Either Ethical • She is supporting her colleague • Working in the best interests of the company • Reference to IEEE <u>in context</u> Or Unethical • Praising one team member instead of the whole team • Others in the team may also have contributed, so she is not being supportive of the whole team • Reference to IEEE <u>in context</u>	2

QUESTION 8.



Question	Answer	Marks
4(a)	1 mark for naming a principle, 1 mark for description to max 3 × 2 • Product • Software engineers shall ensure that their products and related modifications meet the highest professional standards possible. • Judgement • Software engineers shall maintain integrity and independence in their professional judgement. • Management • Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance. • Profession • Software engineers shall advance the integrity and reputation of the profession consistent with the public interest. • Colleagues • Software engineers shall be fair to and supportive of their colleagues. • Self • Software engineers shall participate in life-long learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.	6
4(b)	1 mark per bullet point to max 2 × 2 Data backup • A copy of data will have been made and stored elsewhere. • If the original is lost, the backup can be used to restore the data. Disk-mirroring • The data is stored on two disks simultaneously. • If the first disk drive fails, the data is accessed from the second disk.	4

QUESTION 9.



Question	Answer	
2(a)	1 mark per bullet point • Security: keep data safe from accidental/malicious damage/loss • Privacy: keep data confidential // only seen by authorised personnel	
2(b)	1 mark for identifying method 2 marks for description to max 2 × 3 For example: • User accounts • User has a username and password Access to resources can be limited to specific accounts • Cannot access <u>system</u> without valid username and password // prevents unauthorised access to the <u>system</u> • Firewall • All incoming and outgoing network traffic goes through firewall • Blocks signals that do not meet requirements • Keeps a log of signals • Applications can have network access restricted • Anti-malware • Scans for malicious software • Quarantines or deletes any malicious software found • Scans can be scheduled at regular intervals • Should be kept up to date • Auditing • Logging all actions/changes to the system • In order to identify any unauthorised use • Application Security (accept equivalent) • Applying regular updates / patches • Finding, fixing and preventing security vulnerabilities in any (installed) application	6
2(c)(i)	1 mark per bullet to max 4 • Each byte has a parity bit // horizontal parity • An additional parity byte is sent with vertical (and horizontal) parity • Each row and column must have an <u>even/odd number of 1s</u> • Identify the incorrect row and column • The intersection is the error	4
2(c)(ii)	1 mark for correct answer • Errors in an even number of bits (could cancel each other out)	1



Question	Answer	
2(d)	1 mark per bullet point to max 3 For example: He should ... • ...Keep the client's personal data private • ...Involve the client in the development // ...Communicate with the client • ...Provide the solution that the client asked for • ...Keep the project running on time // budget • ...Keep the client informed of any problems/delays	
2(e)	1 mark per bullet point to max 3 • He uses a compiler because it creates a separate executable file • The executable means the client cannot access the source code // edit the program • The executable means the client does not need the IDE / compiler • It will (probably) be faster to run the executable than to interpret the source code every time the program is run	3