



**General Certificate of Education  
June 2010**

**Computing**

**COMP2**

**Unit 2: Computer Components, The Stored  
Program Concept and the Internet**

**Final**

***Mark Scheme***

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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**Notation used mark schemes:**

- ; - means a single mark  
 // - means alternative response  
 / - means an alternative word or sub-phrase  
**A** - means acceptable creditworthy answer  
**R** - means reject answer as not creditworthy  
**I** - means ignore.

1	(a)	(i)	<b>Hardware:</b> <u>Electrical/physical</u> components/parts/circuits of the computer; <b>R</b> Examples <b>R</b> Just components/parts <b>NE</b> <b>R</b> Physical device <b>NE</b> <b>R</b> System	1
1	(a)	(ii)	<b>Software:</b> Programs/sequences/series of instructions which run / execute (on) the hardware/computer ; <b>R</b> Examples only <b>R</b> Application <b>NE</b> <b>R</b> Code <b>NE</b>	1
1	(b)		1. Special Purpose (software); <b>A</b> Specialist / Specific purpose (software) 2. General Purpose (software); 3. System Software; <b>A</b> Systems Software 4. Utilities;	4
2	(a)	(i)	Hypertext Transfer Protocol; <b>A</b> Hypertext as two words	1
2	(a)	(ii)	HTTPS is secure; HTTPS (usually) uses port 443, HTTP (usually) uses port 80/Use different port numbers; HTTPS uses SSL/Secure Socket Layers; HTTPS is encrypted; <b>R</b> encoded Servers using HTTPS must have a public key certificate; HTTPS allows authentication of client/users/machines//allows access to be restricted to certain clients/users/machines; <b>A</b> Reverse of answers e.g. HTTP is not secure etc. <b>MAX 1</b>	1
2	(a)	(iii)	A description of any website which could reasonably require secure data transmission; <b>R</b> URLs of specific websites <b>R</b> Social networking sites <b>R</b> Bank website <b>NE</b> <b>R</b> online shopping without concept of transaction <b>NE</b>	1

2	(b)		Port that is temporarily assigned/only exists for duration of a connection; Port number automatically allocated // assigned from the client's TCP/IP stack; <b>MAX 1</b> <b>A</b> Port number 1024 - 4095	1
2	(c)		Communication initiated by clients;  Clients must know which port number to connect to // (Server) port number must be known by client (before communication with server starts) // So client can select service;  Particular port numbers are used to provide a particular service // <b>A</b> Example of specific well known port number with its use;  <b>MAX 2</b>	2
3		<b>A</b>	The protocol // This resource uses file transfer protocol;	1
3		<b>B</b>	Address of (ftp) server // Fully Qualified Domain Name; <b>A</b> FQDN <b>R</b> Domain name	1
3		<b>C</b>	Pathname/location of file/page/resource // Description of file structure; <b>R</b> Filename	1
4	(a)	(i)	A <u>biological/physical/behavioural</u> (A by example) property of a person that can be used to identify them / unique; <b>R</b> examples alone	1
4	(a)	(ii)	Fingerprint; Retina / Iris pattern / scan; <b>R</b> Eye scan Facial structure / scan; <b>R</b> Photo of face DNA fingerprint / profile; <b>R</b> DNA Voice pattern / print; Ear print; <b>MAX 1</b>	1
4	(b)		RFID reader/scanner (at passport control) transmits/sends <u>signal</u> ; Signal which <u>activates/energises/induces current</u> RFID transponder/tag; RFID transponder/tag transmits/sends data by <u>radio</u> (wave); Electrical/physical contact between tag and reader not required//tag must be near to reader; Passport may need to be unlocked using Machine Readable	

		Zone(MRZ)/key; <b>MAX 2</b>	2
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5	A	Flash Memory (Card); <b>R</b> memory card	1
	B	Magnetic Tape;	1
	C	CD-ROM; CD-RW; <b>A</b> Flash Memory Card if not given in first question part	1
<b>For all parts reject media not listed in question</b>			



6	(a)	Name or description of any task that is likely to be completed by a robot;	1
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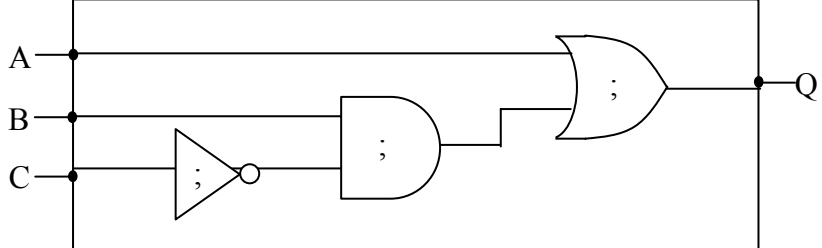
6	(b)	<p>Task is repetitive/monotonous;                  Precise movement required; <b>A</b> accurate movement                  Consistent task completion;                  Robot gives increased productivity/faster than human;                  Task is unpleasant;                  Task is dangerous/improved safety/reduced risk to humans;                  Robot able to operate in environment human could not work in;                  Continuous operation; <b>R</b> humans get tired / need a break                  Cost effective in the long term; <b>R</b> cheaper, "no wages"  <b>RESPONSE MUST BE VALID WITHIN CONTEXT OF TASK NAMED IN PART (a)</b>  <b>MAX 2</b></p>	2
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7	(a)			4
		<b>Number</b>	<b>Component Name</b>	
		1	Memory Address Register	
		2	Address Bus	
		3	Memory Data/Buffer Register	
4	Data Bus			

7	(b)		<p>The <u>instruction</u> is held in the CIR; <b>A</b> IR                  The <u>control unit/instruction decoder</u> decodes the instruction;                  The opcode identifies the type of instruction it is;                  Relevant part of CPU/processor executes instruction; <b>A</b> ALU                  Further memory fetches/saves carried out if required;                  Result of computation stored in accumulator/register/written to main memory;                  Status register updated;                  If jump/branch instruction, PC is updated; <b>A</b> SCR  <b>MAX 3</b></p>	3
7	(c)		<p>Can be <u>displayed</u> in less space; <b>R</b> takes up less space NE                  Easier to remember/learn/read/understand;                  Less error prone;  <b>MAX 1</b></p>	1
7	(d)	(i)	Assembler;	1
7	(d)	(ii)	<p>HLLs are problem oriented;                  HLL programs are portable // machine / platform independent ;                  English like <u>keywords/commands/syntax/code</u>; <b>R</b> closer to English                  Less code required // less tedious to program //                  one to many mapping of HLL statements to machine code commands;                  Quicker/easier to understand/write/debug/learn/maintain code;  <b>R</b> just quicker/easier                  HLLs offer extra features e.g. data types/structures // structured statements // local variables // parameters // named variables/constants;  <b>R</b> procedures/modular  <b>A</b> example of a data structure  <b>NE</b> “extra features” without example                  Speed of execution not crucial for most tasks so faster execution of assembly language not required;                  Most computer systems have a lot of (main) memory/RAM so compact object code not essential;  <b>Accept converse points for Assembly Language</b>  <b>MAX 3</b></p>	3

<b>8</b>			<table border="1"> <thead> <tr> <th>Number</th> <th>HTML tag should be</th> <th></th> </tr> </thead> <tbody> <tr> <td>2</td> <td>&lt;/title&gt;</td> <td>1 mark</td> </tr> <tr> <td>3</td> <td>&lt;ul&gt;</td> <td rowspan="2">} 1 mark</td> </tr> <tr> <td>4</td> <td>&lt;/ul&gt;</td> </tr> <tr> <td>5</td> <td>&lt;em&gt; // &lt;i&gt;</td> <td rowspan="2">} 1 mark</td> </tr> <tr> <td>6</td> <td>&lt;/em&gt; // &lt;/i&gt;</td> </tr> <tr> <td>7</td> <td>&lt;br /&gt; // &lt;br&gt; // &lt;br/&gt;</td> <td>1 mark</td> </tr> </tbody> </table>	Number	HTML tag should be		2	</title>	1 mark	3	<ul>	} 1 mark	4	</ul>	5	<em> // <i>	} 1 mark	6	</em> // </i>	7	  //   //  	1 mark	
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		<p>I Case                  &lt; &gt; Not required                  R &lt;italic&gt; &lt;it&gt;                  Note that (5) and (6) must match, i.e. not &lt;em&gt; and &lt;/i&gt;</p>	<b>4</b>																				

<b>9</b>	<b>(a)</b>		<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="3">OR Gate</th> </tr> <tr> <th>Input A</th> <th>Input B</th> <th>Output Q</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	OR Gate			Input A	Input B	Output Q	0	0	0	0	1	1	1	0	1	1	1	1	<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="3">XOR Gate</th> </tr> <tr> <th>Input A</th> <th>Input B</th> <th>Output Q</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>0</td></tr> </tbody> </table>	XOR Gate			Input A	Input B	Output Q	0	0	0	0	1	1	1	0	1	1	1	0	
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		<p><b>1 mark</b> for each correct output column  <b>A</b> True for 1, False for 0</p>	<b>2</b>																																						

<b>9</b>	<b>(b)</b>			
		<p><b>1 mark</b> for NOT gate correctly linked to input C;  <b>1 mark</b> for AND gate correctly linked to B and <math>\overline{C}</math> as input; <b>A</b> if AND gate linked directly to C</p>		

			<b>1 mark</b> for OR gate with inputs from A and the output of an AND gate and output connected to Q;	3
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<b>9</b>	<b>(c)</b>	<p><b>ALGEBRAIC SOLUTION:</b></p> $B \cdot (A + \bar{B})$ $B \cdot A + B \cdot \bar{B} \quad [ \text{1 mark for expansion of brackets} ]$ $B \cdot A + 0 \quad [ \text{1 mark for identifying that } B \cdot \bar{B} = 0 ]$ $B \cdot A \quad [ \text{1 mark for correct answer} ]$ <p><b>TRUTH TABLE SOLUTION:</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2"></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>B</td> <td><math>\bar{B}</math></td> <td><math>A + \bar{B}</math></td> <td><math>B \cdot (A + \bar{B})</math></td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> </tbody> </table> <p><b>1 mark</b> for both columns X and Y correct  <b>1 mark</b> for column Z correct  <b>1 mark</b> for correct answer (<math>B \cdot A</math>)</p> <p><b>ANY OTHER METHOD:</b>                  If student has used any other method to arrive <u>at correct answer</u> then award marks as follows:  <b>1 mark</b> for correct answer, no working out  <b>2 marks</b> for correct answer with working out, not all steps shown.  <b>3 marks</b> for correct answer with all steps of working out shown.</p> <p><b>A</b> True for 1, False for 0  <b>A</b> alternative notations :  <ul style="list-style-type: none"> <li>• For <math>X \cdot Y</math> allow X AND Y, <math>X \wedge Y</math>, <math>X \cap Y</math>, XY</li> <li>• For <math>X + Y</math> allow X OR Y, <math>X \vee Y</math>, <math>X \cup Y</math></li> <li>• For <math>\bar{X}</math> allow NOT X, <math>\neg X</math></li> </ul> </p>			X	Y	Z	A	B	$\bar{B}$	$A + \bar{B}$	$B \cdot (A + \bar{B})$	0	0	1	1	0	0	1	0	0	0	1	0	1	1	0	1	1	0	1	1	3
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<b>10</b>	<b>(b)</b>	<ol style="list-style-type: none"> <li>1. A type selector applies to a specific (HTML) element/tag;</li> <li>2. Type selectors apply to every instance of that (HTML) element/tag (on a page);</li> <li>3. A (single) class selector can be applied to many/different (HTML) elements/tags;</li> <li>4. Class selectors can be applied selectively to <u>only some</u></li> </ol>	
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		<p>instances of an element/tag // to instances that have the class attribute;</p> <p><b>Must make one point about type selectors and one point about class selectors for two marks</b></p> <p><b>MAX 2</b></p>	2
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11		<p><b>Arguments for DRM:</b>                  Protects <u>copyright</u>//makes it harder to breach copyright/pirate works/ restricts sharing the music;                  Ensures creators/suppliers receive payment for work;                  Preserves incentive for people to develop new works / promotes continuation of business;                  Facilitates online rental service;</p> <p><b>Arguments against DRM:</b>                  Restricts the potential audience;                  Content difficult to access as encrypted;                  Makes it difficult for purchasers to make legitimate copies / backups;                  Prevents use on multiple devices // tied to one or a small number of (hardware) devices;                  Ineffective at preventing copying / example of why ineffective;                  Can restrict playback of music to particular software packages / competing systems incompatible;                  May be unable to listen to music if company ceases to exist / relies on company continuing to exist / unable to listen if can not authenticate copy // unable to listen if NO Internet connection;                  Does not deal with expiry of copyright period;                  Limits creativity/limits collaboration in creating content;</p> <table border="1"> <thead> <tr> <th colspan="2">Mark Bands and Description</th> </tr> </thead> <tbody> <tr> <td>5-6</td> <td> <p><i>To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 4 of the 5 quality of language criteria (QLx).</i></p> <p><b>SUB</b> Candidate has provided a balanced argument for and against DRM (<b>at least two points on either side</b>) , making at least 5 distinct points.</p> <p><b>QL1</b> Text is legible.</p> <p><b>QL2</b> There are few, if any, errors of spelling, punctuation and grammar. Meaning is clear.</p> <p><b>QL3</b> The candidate has selected and used a form and style of writing appropriate to the purpose and has expressed ideas clearly and fluently.</p> <p><b>QL4</b> Sentences and paragraphs follow on from one another clearly and coherently.</p> <p><b>QL5</b> Appropriate specialist vocabulary has been used.</p> </td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Mark Bands and Description</th> </tr> </thead> <tbody> <tr> <td>3-4</td> <td> <p><i>To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 4 of the 5 quality of language criteria (QLx).</i></p> <p><b>SUB</b> Candidate has made at least three points. Additionally, to get four marks, <b>there must be at least one point on each side</b> of the argument.</p> <p><b>QL1</b> Text is legible.</p> </td> </tr> </tbody> </table>	Mark Bands and Description		5-6	<p><i>To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 4 of the 5 quality of language criteria (QLx).</i></p> <p><b>SUB</b> Candidate has provided a balanced argument for and against DRM (<b>at least two points on either side</b>) , making at least 5 distinct points.</p> <p><b>QL1</b> Text is legible.</p> <p><b>QL2</b> There are few, if any, errors of spelling, punctuation and grammar. Meaning is clear.</p> <p><b>QL3</b> The candidate has selected and used a form and style of writing appropriate to the purpose and has expressed ideas clearly and fluently.</p> <p><b>QL4</b> Sentences and paragraphs follow on from one another clearly and coherently.</p> <p><b>QL5</b> Appropriate specialist vocabulary has been used.</p>	Mark Bands and Description		3-4	<p><i>To achieve a mark in this band, candidates must meet the subject criterion (SUB) and 4 of the 5 quality of language criteria (QLx).</i></p> <p><b>SUB</b> Candidate has made at least three points. Additionally, to get four marks, <b>there must be at least one point on each side</b> of the argument.</p> <p><b>QL1</b> Text is legible.</p>	
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			<p><i>QL2</i> There may be occasional errors of spelling, punctuation and grammar. Meaning is clear.</p> <p><i>QL3</i> The candidate has, in the main, used a form and style of writing appropriate to the purpose, with occasional lapses. The candidate has expressed ideas clearly and reasonably fluently.</p> <p><i>QL4</i> The candidate has used well-linked sentences and paragraphs.</p> <p><i>QL5</i> Appropriate specialist vocabulary has been used.</p>	
		1-2	<p><i>To achieve a mark in this band, candidates must meet the subject criterion (SUB). The quality of language should be typified by the QLx statements.</i></p> <p><i>SUB</i> Candidate has made one or two relevant points. The answer may be one-sided.</p> <p><i>QL1</i> Most of the text is legible.</p> <p><i>QL2</i> There may be some errors of spelling, punctuation and grammar but it should still be possible to understand most of the response.</p> <p><i>QL3</i> The candidate has used a form and style of writing which has many deficiencies. Ideas are not always clearly expressed.</p> <p><i>QL4</i> Sentences and paragraphs may not always be well-connected or bullet points may have been used.</p> <p><i>QL5</i> Specialist vocabulary has been used inappropriately or not at all.</p>	
		0	<p>Candidate has not made reference to any of the points listed above.</p>	
		<p>Note: Even if English is perfect, candidates can only get marks for the points made at the top of the mark scheme for this question.</p> <p><b>IF A CANDIDATE MEETS THE SUBJECT CRITERION IN A BAND BUT DOES NOT MEET THE QUALITY OF LANGUAGE CRITERIA THEN DROP MARK BY ONE BAND, PROVIDING THAT AT LEAST 3 OF THE QUALITY OF LANGUAGE CRITERIA ARE MET IN THE LOWER BAND. IF 3 CRITERIA ARE NOT MET THEN DROP BY TWO BANDS.</b></p>		
				6