**National 5: Computing Science**

Revision Paper 1

**Total Marks:** 90 Marks  
**Duration:** 1 Hour 30 Minutes

**Marking Scheme**

|  |  |  |  |  |  |
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| **1** | Describe the difference between an internal and an external hyperlink.  Internal: links to another location within the same website or webpage **(1 Mark)**  External: link to another website **(1 Mark)** | | |  | *2* |
|  |  |  |  |  |  |
| **2** | Describe how a real number is stored in a computer’s memory.  Mantissa **(1 Mark)** Exponent **(1Mark)**  *Award 1 Mark for “Floating Points”* | | |  | *2* |
|  |  |  |  |  |  |
| **3** | The validity of a password is checked as part of a program.  . . .  Line 8 SET passValid TO false  Line 9 RECEIVE userPassword FROM (STRING) KEYBOARD Line10 IF userPassword = storedPassword THEN  Line 11 SET passValid TO true Line 12 END IF  . . .  State the **data type** used to store the variable “passValid”.  Boolean | | |  | *1* |
|  |  |  |  |  |  |
| **4** | Describe how vector graphics are stored in a computer.  Object/ shape **(1 Mark)**  **(1 Mark for)**  Stored as a set of definitions/ properties/ instructions/ attributes  **OR** Examples of at least 2 attributes. | | |  | *2* |
|  |  |  |  |  |  |
| **5** | A graphic of a dog is placed in front of a coloured rectangle.  State a suitable file format for the dog picture.  PNG or GIF – *must be a bit-map file format with transparency.* | | |  | *1* |
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| **6** | Part of a program is shown below.  Line 1: DECLARE score AS REAL INITIALLY 0·0  Line 2: RECEIVE score FROM KEYBOARD  Line 3: IF score > 2·0 THEN  Line 4: SEND “Congratulations. You are in the final” TO DISPLAY  Line 5: ELSE  Line 6: SEND “You have failed to qualify” TO DISPLAY  Line 7: END IF  Describe what happens in Lines 3 to 6 when the value 1·4 is entered at Line 2.  1.4/score/value is less than 2 **(1 Mark)**  Failed to qualify is displayed or line 6 is executed **(1 mark)** | | |  | *2* |
|  |  |  |  |  |  |
| **7** | An example of a database record is shown below.  Explain why the **Employee ID** field required a presence check   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Employees** | | | | | | | **Employee ID** | **Forename** | **Surname** | **Full Time** | **Home Phone** | **Mobile Phone** | | 2365 | Dee | Ross | True | 01383 712345 | 07974 354267 |   Every employee must have an ID – It is primary key. **(1 Mark)** | | |  | *1* |
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| **8** | A complex condition is used to decide if hotel customers qualify for a free night’s stay.  Part of the program is shown below.  . . .  Line 21 IF nightsBooked >= 6 AND (NOT (cardType = Bronze)) THEN  Line 22 SEND custName TO DISPLAY  Line 23 END IF  . . .  State all possible outputs when the following test data is used in this program.   |  |  |  | | --- | --- | --- | | **custName** | **cardType** | **nightsBooked** | | J Kerr | Gold | 3 | | P Singh | Silver | 8 | | R Kroon | Bronze | 7 | | H Smith | Gold | 6 | | | |  | *2* |
|  |  |  |  |  |  |
| **9** | Part of the design of a program is shown below.  Identify the graphical design notation shown below.  download.png  Flow Chart | | |  | *1* |
|  |  |  |  |  |  |
| **10** | Joseph has been asked to develop a website for Glasburgh Safari Park. Joseph makes use of cascading style sheets which can be internal or external. | | |  |  |
|  |  |  |  |  |  |
|  | **a)** | Describe the different between an internal style sheet and an external style sheet.  Internal: within <Head> of HTML document – only applies to individual pages **(1 Mark)**  External: separate linked document, contains all CSS and applied to whole website **(1 Mark)** | |  | *2* |
|  |  |  |  |  |  |
|  | **b)** | Joseph includes a rule in the style sheet to make all the large headings appear in Tahoma font, blue and centred wherever they appear on each page.  Write a CSS rule to manage these large headings.  H1 {font-family: Tahoma; color: blue; text-align: center}  **1 Mark for each declaration.** *Accept colour & centre* | |  | *3* |
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| **11** | When a user works with a piece of electronic equipment, they add to the carbon emissions being produced and realised into the environment. | | |  |  |
|  |  |  |  |  |  |
|  | **a)** | Explain why simply using an Electronic device has an effect on the environment?  Devices using electricity **OR** rare minerals within components | |  | *1* |
|  |  |  |  |  |  |
|  | **b)** | Describe **one** way that the user can minimise the problem  Use energy efficient devices / low power mode or standby / screensaver | |  | *1* |
|  |  |  |  |  |  |
| **12** | Bike Scotland uses a database to store details of its members and affiliated cycling clubs.  **Cyclist**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Membership** **No.** | **Forename** | **Surname** | **Date** **of** **Birth** | **Club** **Code** | | 098-133 | Tracy | Uttley | 30/05/2000 | 12DW39 | | 213-847 | Salim | Hanif | 09/06/1994 | 12DW39 | | 624-536 | Harry | Fence | 01/02/1963 | 12DW39 | | 011-423 | Alojzy | Czajka | 15/03/1979 | 24FW05 | | 773-362 | Maria | Amonte | 02/11/1999 | 24FW05 | | 018-253 | Derrick | Smith | 12/12/1970 | 77SU22 | | 192-033 | Donny | Carruthers | 20/02/1982 | 77SU22 | | 836-555 | Fiona | Hewitt | 20/02/1972 | 77SU22 | | 983-543 | Samantha | Wellbeck | 18/09/1975 | 77SU22 |   **Club**   |  |  |  |  | | --- | --- | --- | --- | | **Club** **Code** | **Club** **Name** | **Founded** | **Number** **of** **Members** | | 12DW39 | District Wheelers | 03/01/1954 | 45 | | 24FW05 | Free Wheel | 16/10/2000 | 67 | | 77SU22 | Spokes United | 29/04/1985 | 29 | | | |  |  |
|  |  |  |  |  |  |
|  | **a)** | State the **field** **type** used to store each Membership Number.  Text – *leading zero, and contains hyphen* | |  | *1* |
|  |  |  |  |  |  |
|  | **b)** | The database contains personal information. | |  |  |
|  |  |  |  |  |  |
|  |  | **i** | State the **Act** with which Bike Scotland must comply.  Data Protection Act |  | *1* |
|  |  |  |  |  |  |
|  |  | **ii** | Describe what Bike Scotland must do to ensure it complies with this  Act when collecting this information.  ***Any one of the eight principles***  Adequate, relevant and not excessive / secure / accurate and up-to-date / fairly & lawfully processed / not kept long than necessary. |  | *1* |
|  |  |  |  |  |  |

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|  | **c)** | Copy & Complete the entity relationship diagram for this database.  Club  Cyclist  Attributes – **1 Mark** / Primary Key – **1 Mark** / Foreign Key – **1 Mark** / Relationship – **1 Mark** | |  | *4* |
|  |  |  |  |  |  |
|  | **d)** | Using SQL list the forename and surname of all members of District Wheelers (12DW39) The list should be in alphabetical order of surname.  SELECT forename, surname  FROM Cyclist, Club  WHERE cyclist.ClubCode = club.ClubCode AND ClubName = “District Wheelers”  ORDER BY surname ASC  **OR**  SELECT forename, surname  FROM Cyclist  WHERE Club Code = “12DW39”  ORDER BY surname ASC  **[1 Mark per Line]** | |  | *4* |
|  |  |  |  |  |  |
|  | **e)** | The Cyclist table has been sorted on two fields. Describe how the table has been sorted.  Club Code ascending **(1 mark)**  Membership Number ascending **(1 mark)** | |  | *2* |
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| **13** | A program is being developed to monitor the availability of parking spaces in a multi-level car park. The car park has three levels, each with 50 numbered spaces and a digital display board that shows the number of spaces available on each level.    Part of the program is shown below.  Line 1 DECLARE redAvailable AS INTEGER INITIALLY 50  Line 2 DECLARE blackAvailable AS INTEGER INITIALLY 50  Line 3 DECLARE yellowAvailable AS INTEGER INITIALLY 50  . . .  < vehicle is detected occupying a space>  . . .  Line 22 IF spaceNumber >= 1 AND spaceNumber <= 50 THEN  Line 23 redAvailable = redAvailable – 1  Line 24 END IF  . . . | | |  |  |
|  |  |  |  |  |  |
|  | **a)** | Explain why integer data types are used in Lines 1 to 3  Only whole numbers can be accepted (can’t have part of a parking space. | |  | *1* |
|  |  |  |  |  |  |
|  | **b)** | Name the part of the computer system that will carry out each of the following tasks during the execution of Line 23. | |  |  |
|  |  |  |  |  |  |
|  |  | **i** | Carries the location of redAvailable in main memory.  Address Bus |  | *1* |
|  |  |  |  |  |  |
|  |  | **ii** | Transfers the value of redAvailable from main memory to the processor.  Data Bus |  | *1* |
|  |  |  |  |  |  |
|  |  | **iii** | Calculates the new value of redAvailable.  Arithmetic Logic Unit (ALU) |  | *1* |
|  |  |  |  |  |  |
|  | When a vehicle parks, the digital display board will be updated to show the number of available spaces on each level. | | |  |  |
|  |  |  |  |  |  |
|  | **c)** | **i** | Copy and complete the condition below that will display the message “FULL” when all spaced on the Red Level are occupied.  IF \_\_\_\_\_\_\_\_\_\_\_ THEN  SEND “FULL” TO DISPLAY  END IF  redAvailable = 0 **OR** redAvailable < 1 *or appropriate variable name* |  | *1* |
|  |  |  |  |  |  |
|  |  | **ii** | Each of the letters of the message **FULL** will be stored as an ASCII character.  Calculate the number of bits required to store this message.  28  *Allow calculation with 7 bit or 8 bit ASCII so accept “32”* |  | *1* |
|  |  |  |  |  |  |
|  | **d)** | Each of the parking space numbers is stored in binary.  State the decimal equivalent of the binary number 01101100  108 | |  | *1* |
|  |  |  |  |  |  |
|  | **e)** | While the parking space program is being developed, it is executed using an interpreter. | |  |  |
|  |  |  |  |  |  |
|  |  | **i** | State one advantage of using an interpreter rather than a compiler at the development stage of a program.  Any **one** from the following:   * No need to leave the programming environment * Tracing facilities * Executes until error found allowing for easy identification of errors   **(1 Mark)**  *Note that both interpreter and compilers translate code one line at a time and return errors. Candidates answer must go further distinguish between the two.* |  | *1* |
|  |  |  |  |  |  |
|  |  | **ii** | The finished program is compiled.  State **two** advantages of executing a compiled version compared to an interpreted version.  Executes/runs faster **(1 mark)**  Doesn’t need translator in memory **(1 mark)**  *Answer must refer to running the* ***compiled program****, so do not accept “Complier runs faster”* |  | *2* |
|  |  |  |  |  |  |

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| **14** | Jenny works for a website design company. Her latest project is to design and implement a website for Go Universe. She creates the website below. | | |  |  |
|  |  |  |  |  |  |
|  | **a)** | Identify **two** features of the user interface that Jenny included to aid navigation.  Any **two** from the following features:   * Search (Bar) * Navigation bar visible at top of page. * Breadcrumb   **(1 mark each)**  *Do not accept individual items of the navigation bar or breadcrumb as these would be links and not features.* | |  | *2* |
|  |  |  |  |  |  |
|  | **b)** | Identify **one** area of this website where Javascript has been used to add interactivity.  Any **one** from the following:   * Search button * Login * Sort By/ Drop down menu * Selection boxes on left * Cart | |  | *1* |
|  |  |  |  |  |  |
|  | **c)** | Jenny used the simple template below when coding the HTML.  <html>  <head>  <title> </title>  </head>  <body>  <div>  <p>Page Heading</p>  </div>  </body>  </html>  Describe how the above HTML was edited to make the words “Go Books” appear at the top of the web browser.  Inserted between the title tags. | |  | *1* |
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| **14 (continued)** | | | |  |  |
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|  | **d)** | The above logo is added to each page using the following code.  <img src=“graphics/logo.bmp” alt=“Logo” style=“width:120px;height:60px;”> | |  |  |
|  |  |  |  |  |  |
|  |  | **i** | The code contains the link to the graphic file. State the type of addressing used  Relative |  | *1* |
|  |  |  |  |  |  |
|  |  | **ii** | Explain why compressing the graphics would benefit the **users** of the Go Universe website.  Transfer speed increased / image loads quicker |  | *1* |
|  |  |  |  |  |  |
|  | **e)** | State one test that could be carried out on the website.  Any **one** from the following:   * Test hyperlinks work * Test layout * Media displays correctly/ appropriately * Test scripts * User accessibility * Browser compatibility | |  | *1* |
|  |  |  |  |  |  |
| **15** | An online pet supply retailer is offering a special deal to customers buying at least **two**, but not more than **six**, bags of pet food. If customers try to buy any other quantity, a message is displayed.  For example: | | |  |  |
|  |  |  |  |  |  |
|  | **a)** | Using a design technique of your choice show how input validation could be used to ensure an acceptable number of bags is entered.  While bags < 2 or bags > 6  Display error message  Input bags from user  End While  (Conditional) loop **(1 mark)**  Correct loop condition **(1 mark)**  Input inside loop **(1 mark)**  Display error message **(1 mark)** | |  | *4* |
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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **b)** | The data in the table below will be used to test the program. Complete the table.   |  |  |  | | --- | --- | --- | | **Type** **of** **Test** **Data** | **Test** **Data** | **Expected** **Results** | | Extreme | 2 **or** 6 | Proceed to next section of code | | Exceptional | Three | Program cannot run! Invalid data type | | **Normal** | 4 | Proceed to next section of code | | | | |  | *2* |
|  |  |  |  | | |  |  |
|  | **c)** | When testing the program using the data from the table, “Three” is entered.  As expected, an error message appears.  **!! Program Cannot Run !!  Invalid Data Type** | | | |  |  |
|  |  | **i** | Name this type of error  Execution (Runtime) | | |  | *1* |
|  |  |  |  | | |  |  |
|  |  | **ii** | Explain why this error occurred when testing the program  Data type expected is number (integer); data entered is a string.  *Entered the word three instead of the number 3.*  *Do not accept invalid data type can’t just restate the question.* | | |  | *1* |
|  |  |  |  | | |  |  |
|  | **d)** | A syntax error can occur when writing code. | | | |  |  |
|  |  |  |  | | |  |  |
|  |  | **i** | Explain what is meant by a syntax error.  When a mistake is made in the program code.  **OR**  When the rules of the programming languages are broken. | | |  | *1* |
|  |  |  |  | | |  |  |
|  |  | **ii** | Explain how the editing features in software development environments can help identify syntax errors  Any **one** from the following:   * Syntax Highlighting * Colour coded variables names * Automatic indentation * Bookmarking/ flags errors * Comments on errors   *Accept “Spell Check” only if the answer clearly shows how the spellchecker would identify the error to the user.* | | |  | *1* |
|  |  |  |  | | |  |  |
| **16** | Blengrae Colts Youth Football Club under 13s squad have a database to keep track of all their players. Each player has to pay a monthly fee towards the running costs.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Players** | | | | | | | Player ID | Forename | Surname | Date Of Birth | Position | Paid Monthly Fee | | 001 | Ryan | McAleer | 30-Dec-05 | Striker | Yes | | 002 | Elena | McAneny | 18-Nov-05 | Midfielder | Yes | | 003 | Harry | McCorkindale | 10-Jun-05 | Defender | Yes | | 016 | Ciaran | Uppal | 26-Feb-05 | Striker | Yes | | 017 | Elah | Curran | 30-Nov-05 | Midfielder | Yes | | 018 | Aidan | Espinosa | 28-Apr-05 | Goalkeeper | Yes | | 020 | Ronan | Freemantle | 25-Jan-05 | Winger | No | | 021 | Amy | Fullerton | 25-Jan-05 | Defender | Yes | | 022 | Sharon | Garaway | 24-Mar-05 | Midfielder | Yes | | 024 | Daniel | Gilchrist | 18-Mar-05 | Defender | No | | 026 | Niall | Irving | 14-Oct-05 | Midfielder | Yes | | | | | |  |  |
|  |  |  |  | | |  |  |
|  | **a)** | Suggest what attribute type should have been used for. | | | |  |  |
|  |  |  | |  | |  |  |
|  |  | **i** | the surname field.  Text | **ii** | the Paid Monthly Fee field.  Boolean |  | *2* |
|  |  |  |  | | |  |  |
|  | **b)** | Using SQL produce a list of all Defenders. This list should be sorted with the oldest player first, and alphabetical order of surname.  SELECT \*  FROM Players  WHERE Position = “Defenders”  ORDER BY Date of Birth ASC, Surname ASC  WHERE **[1 Mark]** ORDER BY **[2 Marks – one for each]**  Fields must be written in the correct order. | | | |  | *3* |
|  |  |  |  | | |  |  |
|  | **c)** | Amy Fullerton has decided to leave and attend a MMA club instead.  The following SQL statement has been created:  DELETE FROM Players  WHERE ‘Date of Birth’ = “25-Jan-05” | | | |  |  |
|  |  |  |  | | |  |  |
|  |  | **i** | Evaluate the effect of the above statement.  Not fit for purpose, Two players will be deleted **(1 Mark)** | | |  | *1* |
|  |  |  |  | | |  |  |
|  |  | **ii** | Write the correct SQL Statement to remove Amy Fullerton  DELETE FROM players WHERE playerID = “021” | | |  | *1* |
|  |  |  |  | | |  |  |
|  | **d)** | Susan Giles has joined the club. She will be member 27, and was born on 10-May-06 and has paid her Monthly Fee. Write the SQL statement that will add Susan into the database.  INSERT INTO Player (Player ID, Forename, Surname, Date Of Birth, Paid Monthly Fee)  VALUES (“027”, “Susan”, “Giles”, “10-May-06”, Yes)  *Candidated must list attributes as entry has no position*  Insert **[1 Mark]** Attributes Listed **[1 Mark]** Values (in order) **[1 Mark]** | | | |  | *3* |

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| **17** | Sea Otter Observations use a simple website to provide information about otters. The home page for the website is shown below. | | |  |  |
|  |  |  |  |  |  |
|  | **a)** | Identify **two** examples of poor consistency is the user interface above.  Any **two** from the following:   * Buttons are different sizes * Font Changes throughout * Text Size / Style changes throughout * Buttons are not aligned   **(1 mark each)** | |  | *2* |
|  |  |  |  |  |  |
|  | **b)** | The developer wants to add a high quality sound file of otters communicate with other to the website. The file is called otter.mp3.  Describe using HTML how this will be added to the website.  <audio>  <source src = “otter.mp3”>  </audio>  audio **(1 mark)** / source **(1 mark)** | |  | *2* |
|  |  |  |  |  |  |
|  | **c)** | See Otter Observations wishes to add a new webpage, which will include …   * Information about otter’s diet. * A photograph of an otter. * A video of an otter eating a fish.   Draw a wireframe design for the new page.  Any appropriate answer.  **[1 Mark]** per item above. | |  | *3* |
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|  | **d)** | The following is an extract from the source code used to generate the Sea Otter Observations home page.  <html>  <head>  <title>Sea Otter Observations</title>  </head>  <body>  <h1 id=“welcome” onmouseover=“mouseOver()”  onmouseout=“mouseOut()”>Welcome to Sea Otter Observations</h1>  <script>  function mouseOver() {  document.getElementById(“welcome”).style.color = “yellow”;  }  function mouseOut() {  document.getElementById(“welcome”).style.color = “black”;  }  </script>  </body>  </html>  Explain what happens when a user places the mouse pointer over the heading “Welcome to Sea Otter Observations”.  The font colour will change to yellow **(1 mark)**, and then back to black one the mouse is removed **(1 mark)** |  | *2* |

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| **18** | A design is created for a simple program. The design is shown below. C:\Users\neile83\Downloads\Untitled Diagram.png | |  |  |
|  |  |  |  |  |
|  | **a)** | State the design technique used in this diagram.  Flow Chart |  | *1* |
|  |  |  |  |  |

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| **18 (continued)** | | | |  |  |
|  | | | |  |  |
|  | **b)** | The design should identify if the pollen count entered by the user is Low *(Below 20)*, Medium *(20 to 49)* or High *(50 & Above)*.   |  |  |  | | --- | --- | --- | |  | Pollen Count | Result | | Test 1 | 501 | Error | | Test 2 | 55 | High | | Test 3 | 30 | Medium | | Test 4 | 50 |  |   The test data for four runs of the program are shown above.  The data indicates there is an error. | |  |  |
|  |  |  |  |  |  |
|  |  | **i** | State the type of error in the design.  The first condition is in correct – logic error.  ***OR*** *No validation for over 500 – so this would be accepted* |  | *1* |
|  |  |  |  |  |  |
|  |  | **ii** | Describe how this error could be corrected.  You may wish to write a description or re-draw part of the design.  First condition should be … is pollen\_count >= 50?  ***OR*** *Add validation* |  | *2* |
|  |  |  |  |  |  |
|  | **c)** | It has been pointed out to the program designer that the design in-efficient.  Explain why the design is in-efficient.  pollen\_count is checked against each condition. use of else…If would make it more efficient. | |  | *2* |
|  |  |  |  |  |  |
| **19** | **a** | C:\Users\neile83\Downloads\Image-1.jpgMatthew uses WhatsApp to message his friends.  WhatsApp uses encryption.  Explain how encryption can keep data secure. | |  | *1* |
|  |  | Messages are encoded by the sender and decoded by the receiver. These are the only two people who are able to read the message. | |  |  |
|  |  |  |  |  |  |
|  | **b** | Matthew’s parents have installed a Firewall on their home network.  Explain the purpose of a Firewall.  A firewall prevents people trying to hack into your computers. | |  | *1* |
|  |  |  |  |  |  |
| **20** | The size of a house is calculated by adding together the floor area of each room.  A programme is required that will ask the user how many rooms are in a house, stored the length and width of each room (as entered by the user) and finally calculate the total floor area of the whole house.  Analyse the problem and identify the input(s), process(es) and the output(s)  Inputs – Number of Rooms, Width & Length of each Room  Process – Calculate area of each room, calculate total area of house  Output – output total area of house.  **[1 Mark for each line]** | | |  | *3* |