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**INFORMATION TECHNOLOGY**

**9626/04**

Paper 4 Advanced Practical

**March 2019**

MARK SCHEME

Maximum Mark: 110

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**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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the March 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

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This document consists of **14** printed pages.

**Generic Marking Principles**

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

**GENERIC MARKING PRINCIPLE 1:**

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

**GENERIC MARKING PRINCIPLE 2:**

Marks awarded are always **whole marks** (not half marks, or other fractions).

**GENERIC MARKING PRINCIPLE 3:**

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

**GENERIC MARKING PRINCIPLE 4:**

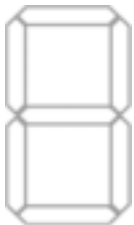
Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

**GENERIC MARKING PRINCIPLE 5:**

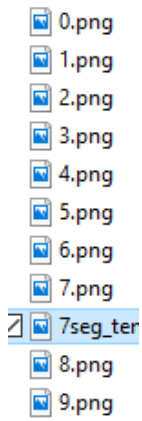
Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

**GENERIC MARKING PRINCIPLE 6:**

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

**Task 1**

The basic shape is as shown in the question paper.	<b>1</b>
The shape is symmetrical horizontally and vertically.	<b>1</b>
The shape is in approximately the same proportions (length and width) as that shown in the question paper.	<b>1</b>
A 7-segment image is created using the single shape.	<b>1</b>
The proportions of the 7-segment image are in approximately the same proportions (length and width) as that shown in the question paper.	<b>1</b>
A grey outline is used for the single shape and the 7-segment image.	<b>1</b>
All the corners of the 7-segment image show a clean joint.	<b>1</b>
The 7-segment image is saved as “7seg_template”.	<b>1</b>
The 7-segment template image is used to create an image of 0 (zero).	<b>1</b>
The 7-segment template image is used to create images of numbers 1 to 9 inclusive.	<b>1</b>

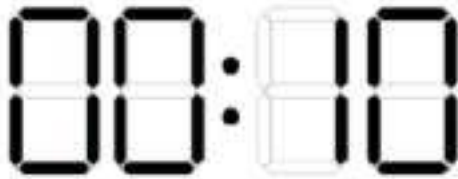


The images of numbers 0–9 are correct.	<b>1</b>
The images of numbers 0–9 are consistent in size and shape.	<b>1</b>
The images of numbers 0–9 are saved as .png files.	<b>1</b>
The images of numbers 0–9 are transparent.	<b>1</b>
All the images are saved at the correct size (60 px · 110 px)	<b>1</b>

**[15]**

**Task 2**

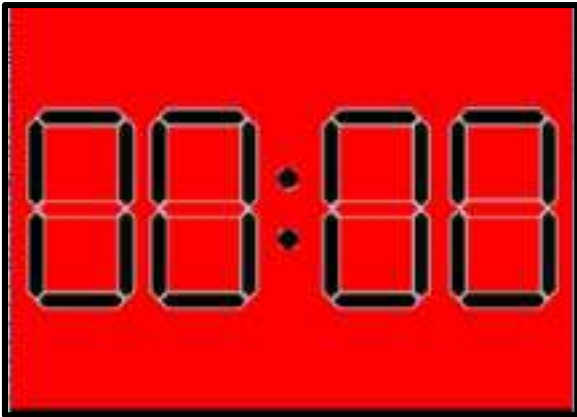
Length	00:00:15
Frame width	350
Frame height	200



The frame of the animation is 350 px wide.	<b>1</b>
The frame of the animation is 200 px high.	<b>1</b>

The animation has a white background during the countdown from 10 to 0.	<b>1</b>
The position of the numbers matches the positions shown in the question paper.	<b>1</b>
The required colon image is inserted between the pairs of numbers.	<b>1</b>
The numbers are evenly spaced.	<b>1</b>
The numbers are aligned correctly.	<b>1</b>
The numbers are evenly spaced within the animation frame.	<b>1</b>
The colon is centred on the horizontal axis of the numbers.	<b>1</b>
The colon is centred on the vertical axis of the numbers.	<b>1</b>

The countdown sequence starts at 10.	<b>1</b>
The sequence counts down from 10 to 0 correctly.	<b>1</b>
The sequence counts down consistently in 1-second intervals.	<b>1</b>
The colon appears to blink.	<b>1</b>
The colon appears to blink at 1 second intervals.	<b>1</b>
The position of the colon is consistent.	<b>1</b>
The position of each number is consistent during the countdown.	<b>1</b>
The animation does not restart after reaching zero.	<b>1</b>



The background of the animation changes to red when the countdown reaches zero.	1
The numbers are resized when the countdown reaches zero.	1
The numbers are shown to be transparent.	1
The size of the numbers and the background of the animation alternates each second.	1
The colour of the background alternates between red and white.	1
The numbers are resized consistently.	1
The alternation lasts for 5 seconds.	1
The sequence ends with a red background.	1
The Alarm sound starts when the countdown sequence reaches zero.	1
The sound plays for the final 5 seconds.	1
The animation is saved as .avi file and plays in a media player.	1
The animation is saved in a suitable format and plays in a browser.	1

**[30]**

**Task 2**

<b>Which type of display would be better for:</b>		
A scrolling noticeboard	A dot matrix display or Display 2.	<b>1</b>
A kitchen timer	A 7-segment display or Display 1.	<b>1</b>

<b>Example applications of each type of display</b>		
Display 1	e.g. Microwave etc. – any valid appliance or application that only needs numbers.	<b>1</b>
Display 2	Display boards etc. – any valid application but the answer must include mention of the need for alphanumeric characters.	<b>1</b>

<b>Cite an advantage of each type of display</b>		
Display 1	Valid examples include: Cheap to manufacture, Simple, reliable electronics, clear for numbers and hex values.	<b>1</b>
Display 2	Valid examples include: Can display alphanumeric characters, symbols etc. Can be stacked for large displays, bright, multicoloured.	<b>1</b>

<b>Identify an application needing a greater number of dots in a matrix.</b>		
Display 2	Any valid example of applications with a need for more dots – higher definition displays, including graphic calculators etc.	<b>1</b>

**[7]**

**Task 3 – Correct values and formatting**

	G	H	I	J	K	L	M	N
1	Company Branch	Total Branch Sales	Average Branch Sales	Highest Individual Sales	Given_name	Family_name	Payroll_number	Rank
2	Amsterdam	€ 5,582,000	€ 279,100	€ 486,000	Bedia	Benjamin	BBE6774031	5
3	Antwerp	€ 3,689,000	€ 245,933	€ 491,000	Eve	Kelly	EKE5120032	3
4	Barcelona	€ 2,257,000	€ 250,778	€ 467,000	Poppy	Miles	PMI2200034	9
5	Gdansk	€ 5,321,000	€ 266,050	€ 487,000	Juliusz	Wysocki	JWY3821048	4
6	Hamburg	€ 4,136,000	€ 295,429	€ 565,000	Kristin	Moeller	KMO2235049	1
7	Hapsburg	€ 470,000	€ 470,000	€ 470,000	Kurt	Lippe	KLI8702050	8
8	Marseille	€ 3,129,000	€ 208,600	€ 411,000	Zachary	Arnold	ZAR9700033	11
9	Naples	€ 4,773,000	€ 318,200	€ 483,000	Lorna	Calabrese	LCA2065039	6
10	Porto	€ 2,828,200	€ 353,525	€ 501,200	Mohammad	Fleming	MFL6270351	2
11	Split	€ 3,333,000	€ 277,750	€ 423,000	Jozá	Stimon	JST3175385	10
12	Tirana	€ 5,269,000	€ 309,941	€ 480,000	Juci	Turt	JTU9790355	7

Column labels are inserted in cells G1:N1.	1	The correct Company Branch names are inserted.	1
Cells G1:N1 have a blue fill.	1	The Company Branch names are inserted in the correct order.	1
Cells G1:N1 have white text.	1	The Hapsburg branch is included.	1
Cells G1:N1 have 10pt text.	1	The values of the Total Sales for each branch are correct.	1
Cells G1:N1 have sans-serif text wrapped and centred as shown in the question paper.	1	The values of the Average Sales for each branch are correct.	1
Cells G1:N1 are 100 px (13.57) wide.	1	The values of the Highest Individual Sales in each branch are correct.	1
		The correct Given_names are displayed.	1
		The correct Family_names are displayed.	1
		The correct Payroll_numbers are displayed.	1
		The Rank for each branch/individual is correct.	1

**Task 3 – Formulae**

**Note: Whole column references are acceptable in this task to allow for the addition or deletion of personnel.**

G	H	I
Company Branch	Total Branch Sales	Average Branch Sales
Amsterdam	=SUMIFS(\$E:\$E,\$D:\$D,\$G2)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G2)
Antwerp	=SUMIFS(E:E,D:D,G3)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G3)
Barcelona	=SUMIFS(E:E,D:D,G4)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G4)
Gdansk	=SUMIFS(E:E,D:D,G5)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G5)
Hamburg	=SUMIFS(E:E,D:D,G6)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G6)
Hapsburg	=SUMIFS(E:E,D:D,G7)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G7)
Marseille	=SUMIFS(E:E,D:D,G8)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G8)
Naples	=SUMIFS(E:E,D:D,G9)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G9)
Porto	=SUMIFS(E:E,D:D,G10)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G10)
Split	=SUMIFS(E:E,D:D,G11)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G11)
Tirana	=SUMIFS(E:E,D:D,G12)	=AVERAGEIFS(\$E:\$E,\$D:\$D,\$G12)

Or

Company Branch	Highest Individual Sales
Amsterdam	=MAXIFS(\$E:\$E,\$D:\$D,\$G2)
Antwerp	=MAXIFS(\$E:\$E,\$D:\$D,\$G3)
Barcelona	=MAXIFS(\$E:\$E,\$D:\$D,\$G4)
Gdansk	=MAXIFS(\$E:\$E,\$D:\$D,\$G5)
Hamburg	=MAXIFS(\$E:\$E,\$D:\$D,\$G6)
Hapsburg	=MAXIFS(\$E:\$E,\$D:\$D,\$G7)
Marseille	=MAXIFS(\$E:\$E,\$D:\$D,\$G8)
Naples	=MAXIFS(\$E:\$E,\$D:\$D,\$G9)
Porto	=MAXIFS(\$E:\$E,\$D:\$D,\$G10)
Split	=MAXIFS(\$E:\$E,\$D:\$D,\$G11)
Tirana	=MAXIFS(\$E:\$E,\$D:\$D,\$G12)

Company Branch	Total Branch Sales	Average Branch Sales
Amsterdam	=SUM(E2:E21)	=AVERAGE(E2:E21)
Antwerp	=SUM(E22:E36)	=AVERAGE(E22:E36)
Barcelona	=SUM(E37:E45)	=AVERAGE(E37:E45)
Gdansk	=SUM(E46:E65)	=AVERAGE(E46:E65)
Hamburg	=SUM(E66:E79)	=AVERAGE(E66:E79)
Hapsburg	=SUM(E80)	=AVERAGE(E80)
Marseille	=SUM(E81:E95)	=AVERAGE(E81:E95)
Naples	=SUM(E96:E110)	=AVERAGE(E96:E110)
Porto	=SUM(E111:E118)	=AVERAGE(E111:E118)
Split	=SUM(E119:E130)	=AVERAGE(E119:E130)
Tirana	=SUM(E131:E147)	=AVERAGE(E131:E147)



A SUMIF(S) formula (or pivot data) is used to calculate the value of the total sales for each branch.	<b>1</b>
A SUM() or SUMIF(S) formula uses the correct ranges and the correct absolute and relative references. Or the correct pivot criteria is used.	<b>1</b>
An AVERAGEIF(S) formula (or pivot data) is used to calculate the value of the Average Sales for each branch.	<b>1</b>
An AVERAGE() or AVERAGEIF(S) formula uses the correct ranges and the correct absolute and relative references. Or the correct pivot criteria is used.	<b>1</b>

Company Branch	Highest Individual Sales
Amsterdam	=MAX(E2:E15)
Antwerp	=MAX(E22:E35)
Barcelona	=MAX(E37:E45)
Gdansk	=MAX(E46:E65)
Hamburg	=MAX(E66:E79)
Hapsburg	=MAX(E80)
Marseille	=MAX(E81:E95)
Naples	=MAX(E96:E110)
Porto	=MAX(E111:E118)
Split	=MAX(E119:E130)
Tirana	=MAX(E131:E147)

There is evidence of the method used to display the value of the Highest Individual Sales in each branch.	<b>1</b>
The formula to display the value of the Highest Individual Sales in each branch uses the correct ranges and the correct absolute and relative references. Or the correct pivot criteria is used.	<b>1</b>

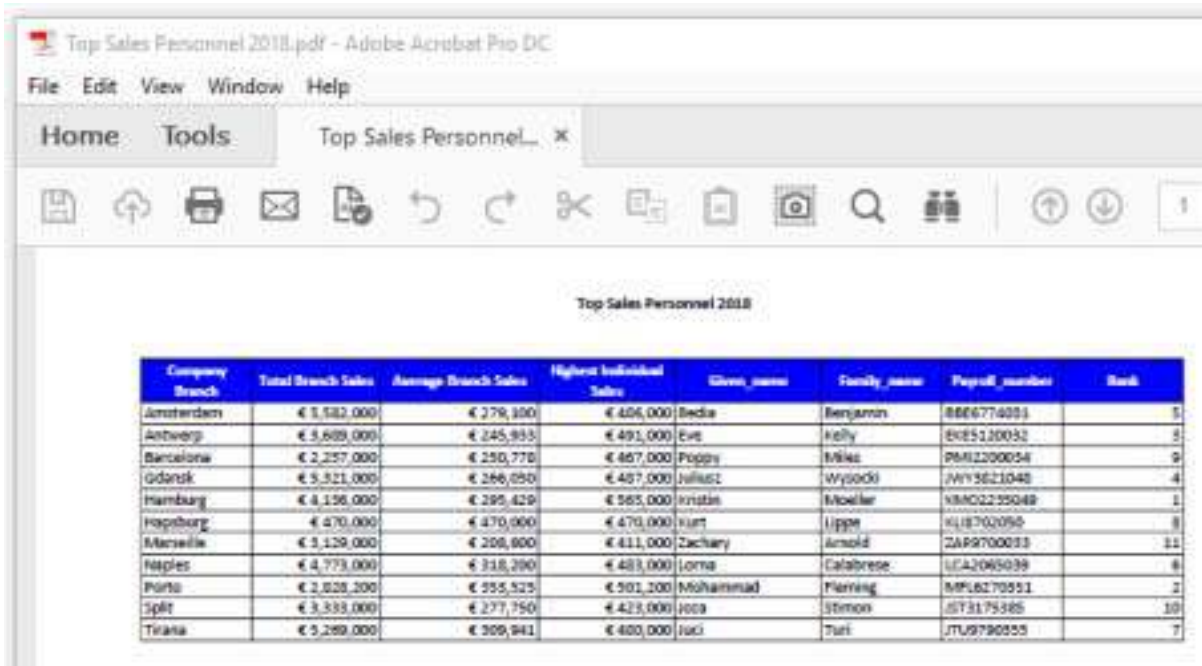
K	L	M
Given_name	Family_name	Payroll_number
=INDEX(\$A:\$E,MATCH(\$J2,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J2,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J2,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J3,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J3,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J3,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J4,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J4,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J4,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J5,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J5,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J5,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J6,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J6,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J6,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J7,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J7,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J7,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J8,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J8,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J8,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J9,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J9,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J9,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J10,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J10,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J10,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J11,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J11,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J11,\$E:\$E,0),3)
=INDEX(\$A:\$E,MATCH(\$J12,\$E:\$E,0),1)	=INDEX(\$A:\$E,MATCH(\$J12,\$E:\$E,0),2)	=INDEX(\$A:\$E,MATCH(\$J12,\$E:\$E,0),3)

Lookup functions are used to display the Given_names, Family_names and Payroll_numbers.	1	A formula using the INDEX and MATCH functions is used to reference the Given_names, Family_names and Payroll_numbers.	1
A formula using a function and the correct references for the Given_names is used.	1	The INDEX/MATCH formula is applied for all 3 personal details.	1
A formula using a function and the correct references for the Family_names is used.	1	A valid criterion (e.g. Highest Individual Sales) is used.	1
A formula using a function and the correct references for the Payroll_number is used.	1		

Given_name	Family_name	Payroll_number	Rank	Rank
Bedia	Benjamin	BBE6774031	5	=RANK(J2,\$J\$2:\$J\$12)
Eve	Kelly	EKE5120032	3	=RANK(J3,\$J\$2:\$J\$12)
Poppy	Miles	PMI2200034	9	=RANK(J4,\$J\$2:\$J\$12)
Juliusz	Wysocki	JWY3821048	4	=RANK(J5,\$J\$2:\$J\$12)
Kristin	Moeller	KMO2235049	1	=RANK(J6,\$J\$2:\$J\$12)
Kurt	Lippe	KLI8702050	8	=RANK(J7,\$J\$2:\$J\$12)
Zachary	Arnold	ZAR9700033	11	=RANK(J8,\$J\$2:\$J\$12)
Lorna	Calabrese	LCA2065039	6	=RANK(J9,\$J\$2:\$J\$12)
Mohammad	Fleming	MFL6270351	2	=RANK(J10,\$J\$2:\$J\$12)
Joza	Stimon	JST3175385	10	=RANK(J11,\$J\$2:\$J\$12)
Juci	Turi	JTU9790355	7	=RANK(J12,\$J\$2:\$J\$12)

There is evidence of the method used to determine the rank of each branch.	1
There is evidence of the use of an <b>efficient method</b> to rank the branches and the branches remain ordered by branch name.	1

**Task 3 – Print to a .pdf document**



The correct table (only) is printed to pdf.	<b>1</b>
The header is inserted and centred.	<b>1</b>
The header is in a 14pt bold serif font.	<b>1</b>
All the required data is visible on a single page.	<b>1</b>

**[35]**

**Task 4**

Explain what is needed to gain information from the data.	An explanation clearly showing understanding that some context must be provided.	<b>1</b>
Identify where to find what is needed to gain the information in this case.	An explanation clearly showing understanding of where context could be determined, e.g. stating that column headings /labels provide the context.	<b>1</b>
State an item of knowledge that can be gained from the information.	An explanation clearly showing understanding of extracting knowledge from data, e.g. Eve Kelly was ranked no. 3 or any valid equivalent.	<b>1</b>

**Task 4**

Demonstrate a clear understanding that data is provided as numbers, dates or text on a label.	Any valid item of data that would be relevant in making a decision about which jar to buy.	<b>1</b>
	A second valid item of data that would be relevant in making a decision about which jar to buy.	<b>1</b>
Show a clear understanding about the context that that is provided by text on the label.	e.g. price shown as currency.	<b>1</b>
	e.g. size/weight shown in grams.	<b>1</b>
Provide a clear explanation of the information used to make the choice.	e.g. calculations of the cost per gram of each jar.	<b>1</b>

**[8]**

**Task 5**

**A digital countdown**



Click the button to start the countdown



The saved Zero image is displayed when page is opened in a browser.	<b>1</b>
The Zero image is the correct size.	<b>1</b>
The cell is filled as shown.	<b>1</b>

**A digital countdown**



Click the button to start the countdown



The 5 image is displayed after the Start button is clicked.	<b>1</b>
The 4 image is displayed next automatically.	<b>1</b>
The 3 image is displayed next automatically.	<b>1</b>
The 2 image is displayed next automatically.	<b>1</b>
The 1 image is displayed next automatically.	<b>1</b>
The 0 image is displayed next automatically.	<b>1</b>
Each number is displayed in 1-second intervals.	<b>1</b>
The numbers are of a consistent size.	<b>1</b>
The sequence ends on 0 and stops cleanly.	<b>1</b>
The page remains intact if code has been added.	<b>1</b>

```

25 //The conditional statement(s) should be inserted here-
26 switch (count) //The switch statement will select the block corresponding to the member of the count variable
27 {
28     case 0:
29         document.getElementById("display").src="0.png"; //These blocks will display .png images in the HTML with element id="display"
30         break;
31     case 1:
32         document.getElementById("display").src="1.png";
33         break;
34     case 2:
35         document.getElementById("display").src="2.png";
36         break;
37     case 3:
38         document.getElementById("display").src="3.png";
39         break;
40     case 4:
41         document.getElementById("display").src="4.png";
42         break;
43     case 5:
44         document.getElementById("display").src="5.png";
45         break;
46     case 6:
47         document.getElementById("display").src="6.png";
48         break;
49     case 7:
50         document.getElementById("display").src="7.png";
51         break;
52     case 8:
53         document.getElementById("display").src="8.png";
54         break;
55     case 9:
56         document.getElementById("display").src="9.png";
57         break;
58     default:
59         document.getElementById("display").src="0.png";
60         break;
61 }

```

Valid explanatory comments have been added.	<b>1</b>
An efficient method is used to create the sequence; e.g. the use of the Switch statement.	<b>1</b>

**[15]****Total: [110]**