

TEACHER GUIDE

ANSWERS AND MARKS

GRADE 8 · INFORMATION AND COMMUNICATION TECHNOLOGY

UNIT 4 Programming



! FOR THE TEACHER ONLY

This booklet has the answers to every exercise in the Unit 4 Student Workbook, in the same order. The exercise letters match the workbook.

i WHAT IS IN THIS GUIDE

- **Marks and pacing** - every exercise and its marks
- **Class marks record** - one page to copy for each class
- **Practicals at a glance** - what to check in 4.1 - 4.10, a model flowchart, textbook links, an oral quiz
- **Answers** - chapters 1 to 4, in the same order as the workbook
- **Unit 4 Test** - the marking scheme and the common mistakes
- **Extra** - homework ideas and an optional practical test

★ BEFORE THE FIRST LESSON

- ☐ Scratch (the offline editor or the online editor) opens on every computer.
- ☐ You have a few real shop bills and a Snakes and Ladders board for the class.
- ☐ The projector works, so you can build each program with the class first.

"Children learn programming best when they make the computer do something."

- THE KING OF ICT

TEACHER GUIDE

Marks and Pacing

You decide how much class time each part needs

Chapter	Exercise	Marks
Chapter 1	A Analyse the problem	9
	B Fill in the blanks	6
	C Input, process or output?	8
	D Answer these	4
	E True or false	6
	F Complete the bill	6
Chapter 2	A Complete the flowchart	6
	B Sequence or selection?	6
	C Put the steps in order	6
	D Name the symbol	8
	E Follow the flowchart	4
	F Answer these	5
Chapter 3	A MOD - odd or even?	8
	B What does each block do?	6
	C What will the cat say?	4
	D Complete the script	5
	E True or false?	8
	F Answer these	4
Chapter 4	A Crossword	10
	B True or false	6
	C Match the app	8
	D Which device would you use?	6
	E Choose the correct answer	10
End	Unit 4 Test	40
TOTAL		189

! SUGGESTED SHAPE OF ONE CHAPTER

READ	Teach the chapter pages. Students read with you and underline the key words.
DO	The practical tasks on real computers, in pairs.
WRITE	The written exercises. Walk around and help.
MARK	Mark the work together. Fill the tick boxes.

★ TEACHING TIP

- Bring a real shop bill to class. Let pairs find the input, process and output before you explain.





TEACHER GUIDE

Class Marks Record

Copy this page for each class

No	Student name	Ch 1 (39)	Ch 2 (35)	Ch 3 (35)	Ch 4 (40)	Test (40)	Total (189)
1							
2							
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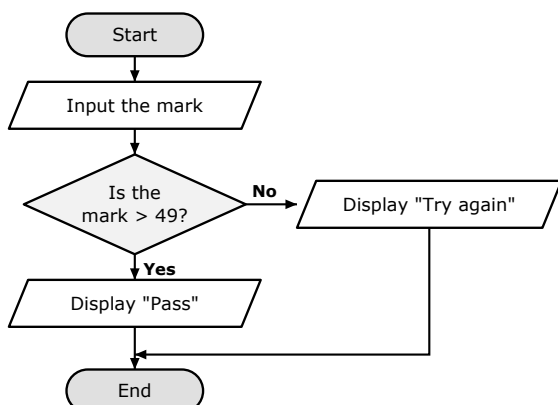
TEACHER GUIDE

Practicals at a Glance

Workbook activities 4.1 to 4.10

Activity	Students make	Check that ...
4.1	Analysis of a real bill	inputs are circled, each price is checked (number × unit price) and the input, process and output are written.
4.2	Five Pens program	the variables price_per_pen and Total are used; 20 gives "Total is 100".
4.3	Pass / Try again flowchart	Start, input, a decision (mark > 49?), two outputs, End; arrows labelled Yes and No (model below).
4.4	Comparison blocks	1 < 2 gives true and 2 < 1 gives false; three own blocks are recorded correctly.
4.5	Logical blocks	the six examples in the table give the same answers on the computer.
4.6	Account balance	2000 gives "Balance = 3000"; 6000 gives no message (5000 > 6000 is false).
4.7	Odd or even	13 gives Odd number; 20 gives Even number; 0 gives Even number.
4.8	Password checker	cat12 (5 characters) is weak; colombo2024 (11 characters) is strong.
4.9	Snakes and Ladders	the blocks are in the right order; a Yes answer moves the counter and stops the script.
4.10	Apps survey	five apps with their uses; an adult was there; nothing was downloaded.

i PRACTICAL 3 - MODEL FLOWCHART



Accept any correct shapes and wording.
Check:

- Start and End are ovals.
- Input and the two outputs are parallelograms.
- The condition is in a diamond.
- The arrows are labelled Yes and No.
- 75 gives Pass, 30 gives Try again.

Textbook links

Workbook	Textbook (Grade 8, Unit 4)	Activities
Chapter 1 - Problem analysis	pages 39 - 41	4.1
Chapter 2 - Control structures and flowcharts	pages 41 - 45	4.2, 4.3
Chapter 3 - Selection in Scratch	pages 45 - 50	4.4 - 4.9
Chapter 4 - Mobile and smart devices	pages 51 - 53	4.10
Unit 4 in One Page	page 54 (Summary)	-



? QUICK ORAL QUIZ - START OR END A LESSON WITH IT

Ask the class ...	Answer
1. What do we call the data that we need to solve a problem?	Input
2. Price = number of items × unit price. Input, process or output?	Process
3. Which flowchart symbol is a diamond?	Decision
4. Which symbol shows an input or an output?	Parallelogram
5. Steps one after the other, in order: which control structure?	Sequence
6. Which control structure will they learn in Grade 9?	Repetition
7. Which Scratch block has an ELSE part?	IF THEN ELSE
8. What does the block $2 < 1$ give?	false
9. What is $10 \text{ MOD } 2$? Is 10 odd or even?	0, even
10. Which device takes photos from the sky?	Drone camera

ANSWERS

Chapter 1

Problem analysis

A Analyse the problem

9 marks

Problem	Input	Process	Output
Find the total marks of three subjects	The marks of the three subjects	Total = mark 1 + mark 2 + mark 3	The total marks
Find the area of a rectangle	The length and the width	Area = length × width	The area
Find the balance when you pay for a book with a Rs. 500 note	The price of the book (and the Rs. 500)	Balance = 500 - price of the book	The balance

1 mark for each correct cell. Accept the same idea in other words.

B Fill in the blanks

6 marks

1. smaller	2. analyse	3. input	4. process
5. output	6. unit price		

C Input, process or output?

8 marks

1. The total marks - Output	2. The price of one pen - Input
3. Select the first two digits - Process	4. The year of birth - Output
5. Add the three marks - Process	6. The NIC number - Input
7. Price of a pen × 5 - Process	8. The marks of the three subjects - Input



D Answer these

4 marks

1. What is problem analysis? (2 marks)

Dividing a problem into smaller parts and examining them, so that the problem is easier to solve (we find the input, process and output). 2 marks for this idea.

2. Why must we analyse a problem before we develop a computer program? (2 marks)

To find the inputs, the process and the outputs. Then we know what the program needs, what it must do and what it must give. 2 marks for a clear reason.

E True or false

6 marks

- T** - We should analyse a problem before we develop a computer program.
- F** - The output is the method we use to solve a problem.
- T** - In a bill, the unit price is an input.
- F** - Analysing a problem makes it harder to solve.
- T** - Price = number of items × unit price is a process.
- F** - When we find the year of birth from an NIC number, the year of birth is the input.

F Complete the bill

6 marks

1. Fish bun: 120.00	2. Vadai: 100.00	3. Milk packet: 150.00	4. Total: 370.00
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- Which columns are the input? → **Item, number of items and unit price**
 - What is the output of this bill? → **The price of each item and the total (Rs. 370.00)**
- 1 mark for each price, 1 for the total, 1 for each question.

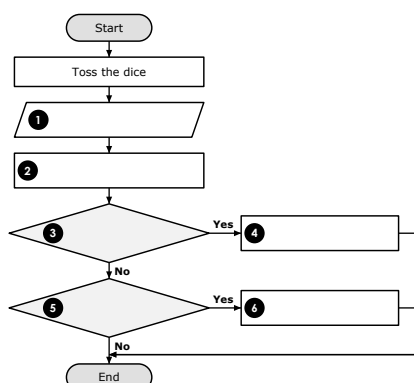
ANSWERS

Chapter 2

Control structures and flowcharts

A Complete the flowchart

6 marks



- Get the value**
- Move the counter forward by the value**
- Did you reach the bottom of a ladder?**
- Move the counter to the top of the ladder**
- Did you reach a snake's head?**
- Move the counter to the tail of the snake**

1 mark each. The ladder question comes first, as in the rules.



B Sequence or selection?

6 marks

1. Input the price of a pen. Multiply it by 5. Display the total. → **Sequence**
2. If it rains, go to the library. If not, go to the playground. → **Selection**
3. If the answer is correct, award 10 marks. → **Selection**
4. Wake up, brush your teeth, wash your face, wear your uniform. → **Sequence**
5. Select the first two digits of the NIC number. Display the year of birth. → **Sequence**
6. If the remainder is 0, say "Even number". Else, say "Odd number". → **Selection**

C Put the steps in order

6 marks

The numbers the student writes, from the top of the list down:

1. **5** - Award 10 marks (only when the answer is correct).
2. **1** - Start.
3. **3** - Obtain the answer.
4. **6** - End.
5. **2** - Ask the question.
6. **4** - Check: is the answer correct?

D Name the symbol

8 marks

1. Decision	2. Input / Output	3. Process	4. Start / End
5. Input / Output	6. Decision	7. Process	8. Start / End

E Follow the flowchart

4 marks

1. 25 → Big	2. 4 → Small	3. 10 → Small	4. 11 → Big
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10 gives **Small**: $10 > 10$ is false, so we follow No. 1 mark each.

F Answer these

5 marks

1. Write the three types of control structures. (3 marks)

Sequence, selection and repetition. 1 mark each.

2. Write one difference between sequence and selection. (2 marks)

In a sequence, all the steps are carried out one after the other, in order. In selection, a condition is checked, and the program decides which step(s) to carry out (Yes or No). 2 marks for a clear difference.

★ TEACHING TIP

- Draw the four flowchart symbols on a corner of the board and keep them there for the whole unit.



ANSWERS

Chapter 3

Selection in Scratch

A MOD - odd or even?

8 marks

1. $10 \text{ MOD } 3 = 1$	2. $17 \text{ MOD } 5 = 2$	3. $8 \text{ MOD } 2 = 0$	4. $15 \text{ MOD } 4 = 3$
1. $7 \text{ MOD } 2 = 1$ - Odd	2. $12 \text{ MOD } 2 = 0$ - Even		

1 mark for each remainder, 1 mark for each odd / even.

B What does each block do?

6 marks

1. when green flag clicked → C	2. ask [] and wait → E
3. set [Value] to (answer) → F	4. say [] for 2 secs → A
5. if < > then → D	6. stop [this script] → B

C What will the cat say?

4 marks

1. **2000** → **Balance = 3000**
2. **4500** → **Balance = 500**
3. **5000** → **Nothing (5000 > 5000 is false)**
4. **7000** → **Nothing (5000 > 7000 is false)**

5000 is not greater than 5000, so the IF THEN block does not run.

D Complete the script

5 marks

1. length of	2. answer	3. <	4. 8	5. Weak password
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Only < is correct: a password with exactly 8 characters must be strong.

E True or false?

8 marks

1. $5 > 3$ - true	2. $4 = 7$ - false
3. $7 > 7$ - false	4. $6 = 6$ - true
5. $(3 < 5)$ and $(2 = 2)$ - true	6. $(3 < 5)$ and $(4 > 6)$ - false
7. $(1 > 2)$ or $(5 = 5)$ - true	8. not $(6 > 1)$ - false

Number 3: $7 > 7$ is **false** - equal is not greater.



F Answer these

4 marks

1. What is the difference between the IF THEN block and the IF THEN ELSE block? (2 marks)

IF THEN runs its blocks only when the condition is satisfied (true). IF THEN ELSE has two parts: the first part runs when the condition is true, the second part runs when it is false. 2 marks.

2. Write two things that we can make with Scratch. (2 marks)

Any two: games, music, animations, interactive stories. 1 mark each.



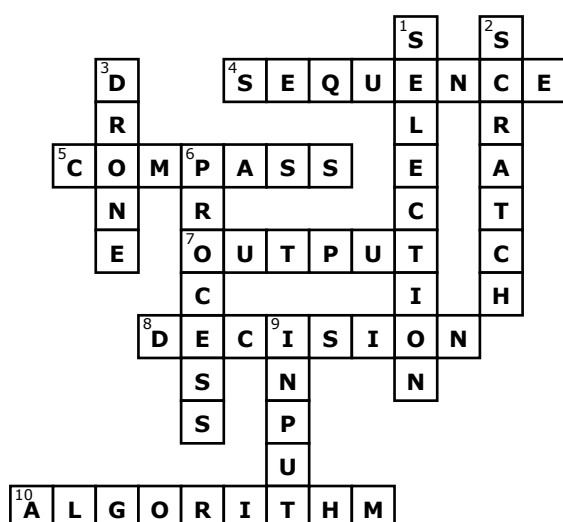
ANSWERS

Chapter 4

Mobile and smart devices

A Crossword

10 marks



Across: 4 SEQUENCE, 5 COMPASS, 7 OUTPUT, 8 DECISION, 10 ALGORITHM

Down: 1 SELECTION, 2 SCRATCH, 3 DRONE, 6 PROCESS, 9 INPUT

B True or false

6 marks

- T** - Tablets and laptops are general purpose machines.
- F** - We must buy every app before we can use it.
- T** - We install an app on the device before we use it.
- T** - A smart watch can send SMS messages and set alarms.
- F** - A sky map app translates text into another language.
- T** - Each smart device is made for a specific function.

★ TEACHING TIP

- Act out a flowchart: one student reads the symbols, the class follows the arrows and answers Yes or No.



C Match the app

8 marks

1. Compass → C	2. Route map → F
3. Sky map → H	4. QR code reader → D
5. Language translator → A	6. Chess game → G
7. Dictionary → E	8. Voice recorder → B

D Which device would you use?

6 marks

1. Take photos of your school from the sky → **Drone camera**
2. Record a TV programme to watch later → **Smart TV**
3. See the time and read an SMS on your wrist → **Smart watch**
4. Watch scenery in 3D form → **Smart sunglasses**
5. Take photos and send them to other smart devices → **Smart camera**
6. Make a phone call and send an MMS message → **Smart phone**

Also accept smart phone for 5.

E Choose the correct answer

10 marks

1. (c) input	2. (b) program
3. (b) diamond	4. (d) sequence
5. (a) IF THEN ELSE	6. (c) false
7. (a) and	8. (d) drone camera
9. (b) compass	10. (a) tablets and laptops



TIP: In Scratch, show how to drop the variable block into a slot. Many students type the name instead.

MARKING SCHEME

Unit 4 Test

Total 40 marks

1 Choose the correct answer

8 marks (1 each)

1. (a) smaller parts	2. (b) the price of a pen
3. (c) parallelogram	4. (b) selection
5. (a) IF THEN	6. (d) true
7. (b) 1	8. (c) voice recorder



2 Fill in the blanks

8 marks (1 each)

1. process	2. output	3. sequence	4. decision
5. programming	6. and	7. 3	8. bought (purchased)

3 Name the picture

8 marks (1 each)

1. Decision	2. Input / Output	3. Process	4. Start / End
5. IF THEN block	6. IF THEN ELSE block	7. and (logical block)	8. < (comparison block: smaller than)

4 Answer these

16 marks

1. Analyse this problem: "Find the cost of 4 books when the price of one book is given." Write the input, the process and the output. (3 marks)

Input: the price of one book. Process: cost = price of one book $\times$ 4. Output: the total cost. 1 mark each.

2. Write the three types of control structures. (3 marks)

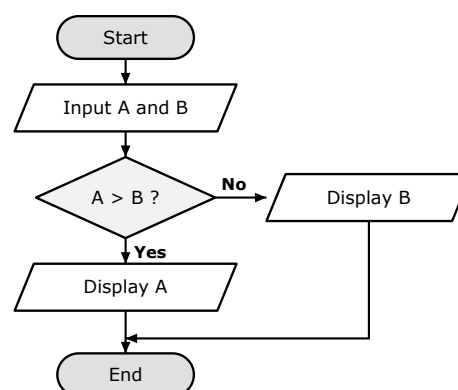
Sequence, selection and repetition. 1 mark each.

3. Write the difference between the IF THEN block and the IF THEN ELSE block. (2 marks)

IF THEN runs its blocks only when the condition is true. IF THEN ELSE runs the first part when the condition is true and the second part when it is false. 2 marks.

4. Draw a flowchart: Input two unequal numbers A and B. If A > B, display A. If not, display B. (5 marks)

1 mark each: Start and End; the input symbol (Input A and B); the decision symbol (A > B?); the two output symbols (Display A / Display B); correct arrows labelled Yes and No.



5. Write THREE smart devices. Write one use of each. (3 marks)

Any three, 1 mark each (device and a correct use): laptop - general computer work; tablet - Internet, photos; smart phone - calls, SMS, photos; smart TV - recording TV programmes; smart camera - photos sent to other devices; smart watch - time, SMS, alarms; smart sunglasses - 3D scenery, photos; drone camera - photos and videos from the sky.

TIP: Revise the signs <, = and > from maths before section 4.9 (comparison blocks).



WHAT STUDENTS USUALLY GET WRONG

- They mix up **input** and **output**. Input goes in (data); output comes out (the solution).
- They draw input and output in a rectangle. Input / output = **parallelogram**; rectangle = process.
- They forget to label the two arrows from a decision with **Yes** and **No**.
- They think $10 > 10$ is true. Equal is **not** greater, so the answer is false.
- They mix up **and** (both sides true) and **or** (one side is enough).
- They think MOD gives the answer of the division. MOD gives only the **remainder**.

HOMEWORK AND EXTRA PRACTICE

- Find a bill at home. Write its input, process and output.
- Draw a flowchart for a day-to-day decision, for example: if the bus is full, wait for the next bus.
- Write five numbers. Find each number MOD 2 and say whether it is odd or even.
- List the smart devices at home and one app on each.
- Fast learners: make a Scratch program that asks for a mark and says Pass or Try again.

PRACTICAL TEST - 20 MINUTES, 20 MARKS (OPTIONAL)

Use it after the unit, in the computer room. The student makes a Scratch program called **Pass or Try again**. Read the steps aloud or write them on the board. Mark on the screen.

Step	The student must ...	Marks
1	Make a variable called mark .	2
2	Start the program with when green flag clicked .	2
3	Ask Enter your mark and wait.	2
4	Set mark to answer .	2
5	Use an if ... then ... else block with the condition mark > 49 .	4
6	If true, say Pass for 2 secs.	2
7	If false, say Try again for 2 secs.	2
8	Test the program with 75 and with 30.	2
9	Save the project with your name.	2
	Total	20

TEACHING TIPS

- Ask students to test every program twice: once with a value that makes the condition true, once false.
- For MOD, share 13 sweets (or counters) among 5 friends. The 3 left over are the remainder.

