Grade 6 Computing

Unit 3 · Algorithms: Step by Step

WORKSHEET

Full marks 31

Name _____ Class _____ Roll no. ____ Date _____ Marks _____ / 31

1 Key words [4]

Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

algorithm	bug	condition	data type	debugging	instruction	repetition	sequence	tracing	variable

An _____ is a list of exact steps that does a job or solves a problem. Each step is an _____. Doing the steps one after another, in order, is called _____, and doing the same steps again is called _____. A choice does some steps only when its _____, a yes-or-no question, is true. A named place that holds one piece of information, which can change, is a _____. Following an algorithm by hand, step by step, exactly as a computer would, is called _____ it. Finding a mistake in an algorithm and fixing it is called _____.

2 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Which instruction is precise enough for a robot? [1]

a. Add a little sugar.
b. Boil it for a while.
c. Add 2 spoons of sugar.
d. Put enough water in.

ii. Which step is done more than once? [1]

a. Turn the stove on.
b. If it is raining, take an umbrella.
c. Repeat 20 times: fold a momo.
d. Say “Hello”.

iii. Which of these is a good condition for a choice? [1]

a. “Make chiya.”
b. “Is the milk boiling?”
c. “Some sugar.”
d. “Repeat 5 times.”

iv. A variable holds the name of a district, “Lalitpur”. What is its data type? [1]

a. number
b. text
c. yes/no
d. it has no type

v. An algorithm says: “Repeat until the bucket is full: pour in one cup of water.” The bucket has a hole in the bottom that lets water out faster than you pour. What happens? [1]

a. The bucket fills after a few cups.
b. The repeat never ends, because the bucket never fills.
c. The algorithm stops after one cup.
d. Nothing: the algorithm can’t start.

3 Sequence [3]

Read the steps, then answer.

These steps for making chiya are mixed up, and one step is missing.

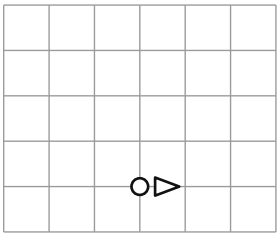
a. Strain the chiya into 2 cups.
b. Boil for 3 minutes.
c. Pour 1 cup of water and 1 cup of milk into the pot.
d. Add 2 spoons of tea leaves and 2 spoons of sugar.
e. Turn the stove on.

i. Write the letters in the right order.
ii. Write the missing step, and say where it goes.

4 Directions on squared paper [5]

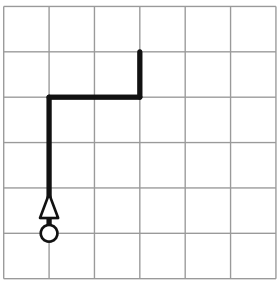
One square is one block. North is up the page.

a. You start at ○, facing east (→). Follow these directions and draw your path on the squared paper: turn left, forward 2 blocks, turn left, forward 1 block, turn left. Draw an arrowhead where you end, pointing the way you face. Which way are you facing at the end? [2]



One square is one block. ○ is where you start; the arrow shows the way you face.

b. A walker starts at ○, facing north, and walks the path drawn. Write its directions with **forward**, **turn left** and **turn right**. Use repetition (such as "forward 3 times") to make them short. [3]



One square is one block. ○ is where the walker starts; the arrow shows the way it faces.

5 Trace the algorithm [3]

Fill in the trace table: what each step puts in each variable.

The tea shop's algorithm. Trace it for Gita, who wants 3 cups of black tea.

1. Ask the customer's name. Keep it in **name**.
2. Ask how many cups. Keep the number in **cups**.
3. Ask "Milk tea?" Keep the answer in **milk**.
4. If **milk** is yes, **price** = 30. Otherwise, **price** = 20.
5. **bill** = **cups** × **price**.
6. Say: "**name**, please pay Rs **bill**."

Step	name	cups	milk	price	bill
1					
2					
3					
4					
5					

What does the algorithm say at step 6?

6 Find and fix the bug [3]

Test the algorithm, then answer.

A school gives a prize to students whose marks are 80 or more. Raju writes this algorithm:

1. Ask the student's marks. Keep the number in **marks**.
2. If **marks** is more than 80, say "Prize!". Otherwise, say "Well done."

Test it with marks of 92, 80 and 45. Which test finds a bug? Fix the algorithm.

7 Data types [2]

Read the table, then answer.

Write the data type of each variable: number, text or yes/no.

Variable	Value	Data type
`marks`	78	
`city`	Pokhara	
`passed`	yes	
`students`	32	

8 Long answer [4]

Write a long answer to the following question.

Design an algorithm for a bus conductor that works out one passenger's fare. A ride costs Rs 30, students pay half, and children under 5 years old ride free. Use variables (with their data types) and choices. Then test it with three passengers of your own.

9 Think [2]

Think, then answer.

A tea shop gives Rs 10 off for 5 cups or more. Its algorithm was tested with 2 cups and with 6 cups, and both tests passed, but it still had a bug. Which test would have found the bug, and why is it a good test to choose?

10 Activity: Be the robot (not marked)

Work in pairs, back to back, with paper and a pencil. One of you has a simple drawing (a house, a kite, a fish); the other is a robot who may do only exactly what is said, with no questions and no peeking. Tell the robot, step by step, how to copy the drawing. Compare the two drawings, then swap.

Try	My drawing was	Words that confused the robot	How alike were the drawings?
first try			
second try			
after swapping			