Unit 3 · Programming: Variables and Choices

WORKSHEET

Full marks 32

Name _____ Class _____ Roll no. ____ Date _____ Marks _____ / 32

1 Key words [4]

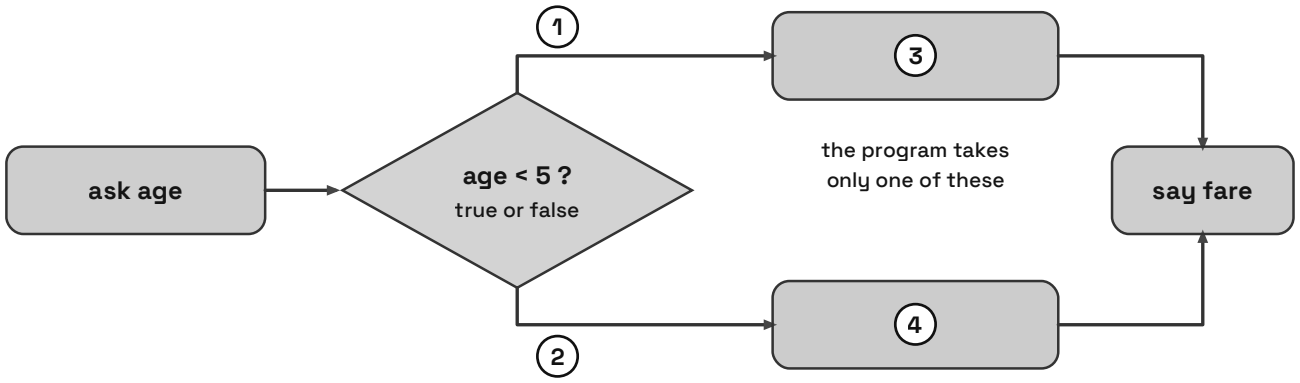
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

Boolean	comparison operators	condition	event	input	loop	selection	string	trace table	variable

A named place in memory that holds one value is a _____. Information that comes into a program from outside while it runs is _____. A question whose answer is true or false is a _____, and the signs $<$, $>$ and $=$ are _____. The true/false type is also called _____, and text is usually called a _____ by programmers. Choosing which blocks to run, depending on a condition, is called _____. A table that shows each variable's value after each step of a program is a _____.

2 Label the diagram [2]

The diagram shows the bus fare program as two paths. Write what belongs in place of 1 to 4. Each carries 0.5 mark.



1. _____ 2. _____

3. _____ 4. _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. A program runs **set score to 5**, then **change score by 3**, then **set score to 0**, then **change score by 2**. What is in **score** at the end? [1]

a. 10 **b.** 8

c. 2 **d.** 0

ii. What does **join 10 5** make? **[1]**

a. 15 **b.** 105
c. 50 **d.** 10 5

iii. **marks** holds 40. Which condition is **true**? **[1]**

a. marks $>$ 40 **b.** marks $<$ 40
c. marks $>$ 39 **d.** marks $=$ 39

iv. A bus gives a free ride to children under 5. Which condition is true exactly for the children who ride free? **[1]**

a. age $<$ 5 **b.** age $>$ 5
c. age $<$ 6 **d.** age $=$ 5

v. A program says: **if score $>$ 7 then say "Gold" else say "Keep trying"**. **score** holds 7. What does it say? **[1]**

a. Gold **b.** Keep trying
c. Both **d.** Nothing

4 True or false **[2]**

x holds 6 and **y** holds 9. Write True or False after each condition.

i. x $<$ y ☐

ii. x $>$ 6 ☐

iii. x + 3 $=$ y ☐

iv. y $<$ x ☐

5 What does it say? **[4]**

Write exactly what each program says, in the box under it.

a. **[2]**

```
1  set score to 5
2  change score by 3
3  say score
4  set score to 0
5  change score by 2
6  say join "Score: " score
```

OUTPUT

b. **[2]**

```
1  set a to 12
2  set b to 3
3  say (a + b)
4  say join a b
```

OUTPUT

6 Trace the program [3]

Fill in the trace table: what each step puts in each variable, and what the program says.

The user types **4** when the program asks.

```
1  ask “Pick a number” and keep the answer in n
2  set total to n × 2
3  if total > 10 then
4      change total by -10
5  else
6      change total by 5
7  say total
```

Step	Block	n	total	Says
1	ask			
2	set total to n × 2			
3	if total > 10?			
4				
5	say total			

7 Find and fix the bug [3]

Read the program, then answer.

A shop gives a free pen to anyone who buys **5 or more** notebooks. Here is Bijay’s program, with its lines numbered.

```
1  ask “How many notebooks?” and keep the answer in notebooks
2  if notebooks > 5 then
3      say “Here is your free pen!”
4  else
5      say “Thank you!”
```

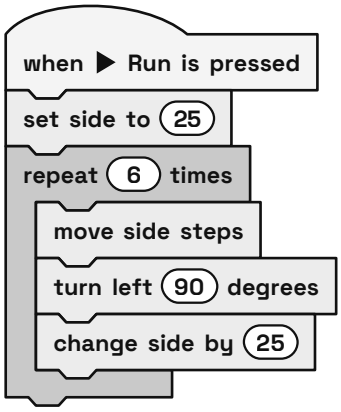
i. What does it say to a customer who buys exactly 5 notebooks? Is that right?

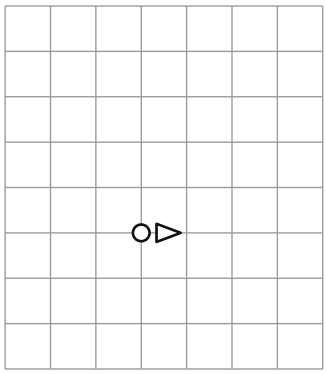
ii. Which line has the bug?

iii. Write that line correctly.

8 Draw what the turtle draws [3]

The turtle starts at ○, facing the way the arrow points. One square is 25 steps. Draw on the squared paper what the script makes, and draw an arrowhead where the turtle ends, pointing the way it faces.





One square is 25 steps. ○ is where the turtle starts; the arrow shows the way it faces.

9 Long answer [4]

Write a long answer to the following question.

Design a program that asks for a student's marks out of 100 and says "Distinction" for 80 or more, "Pass" for 40 to 79, and "Not yet" below 40. List its variables with their types, write its blocks in plain words, and give five tests with the answers they should give.

10 Think [2]

Think, then answer.

In the game Guess my number, the computer picks a number from 1 to 20, and after each wrong guess it says "bigger" or "smaller". What is the best first guess, and why? How should you go on guessing?

11 Activity: Be the computer

(not marked)

Play Guess my number in pairs, with no computer. One of you is the computer: secretly write a number from 1 to 20, and after each guess say only “bigger”, “smaller” or “right”. The other starts with 5 points and loses one for each wrong guess. Fill in a row for each guess, then swap.

Guess number	Guess	The computer said	Points
1			5
2			
3			
4			
5			