# FLOWCHART

(May/June 2015)

Q 1   The flowchart below inputs the weight of a number of parcels in kilograms. Parcels weighing more than 25 kilograms are rejected. A value of –1 stops the input. The following information is output: the total weight of the parcels accepted and number of parcels rejected.
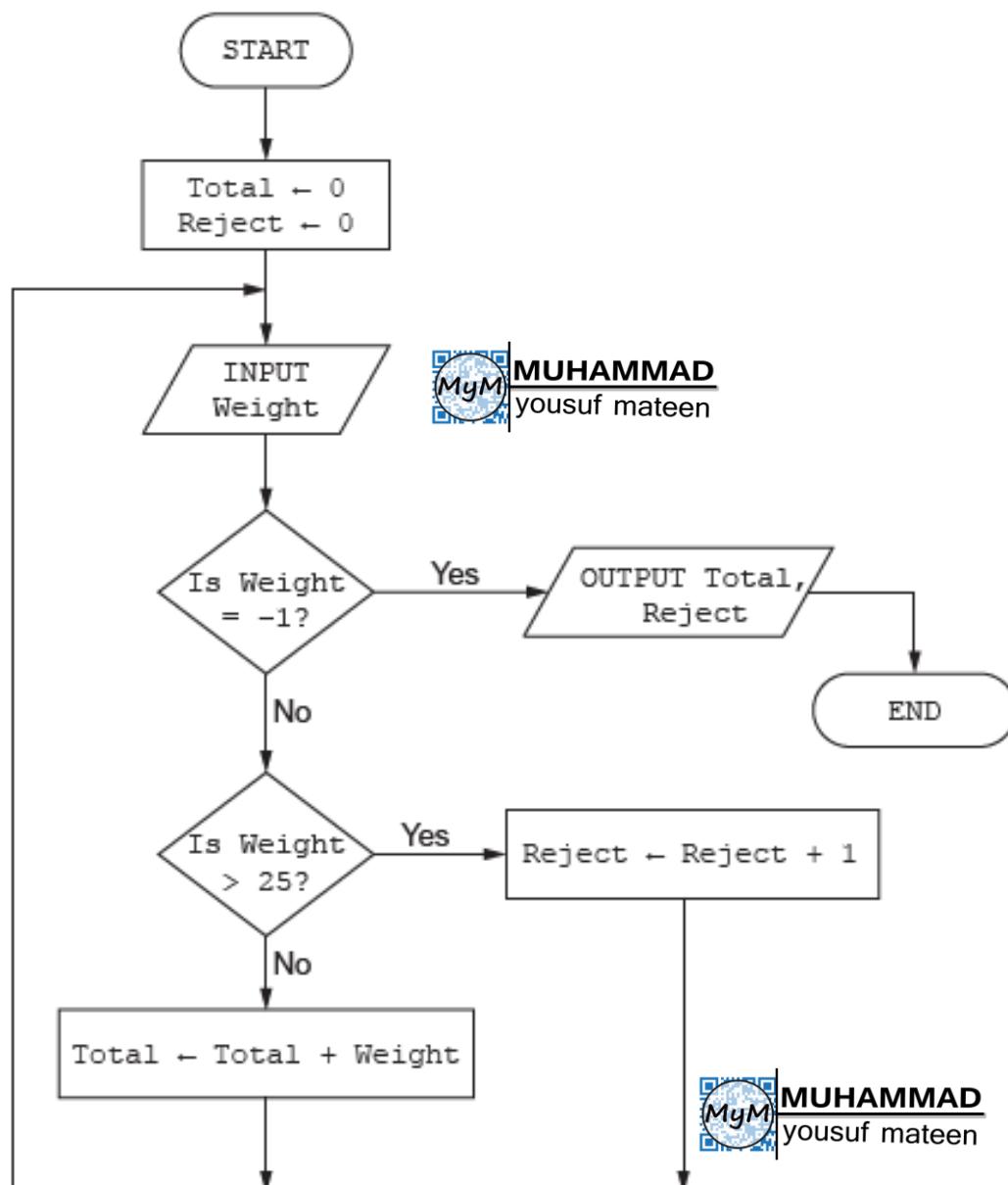
Complete the trace table for the input data:

1.8, 26.0, 7.0, 11.3, 10.0, 2.5, 25.2, 5.0, 19.8, -1

Total	Reject	Weight	OUTPUT

Q 2   The flowchart below input six single digit numbers. The predefined function
MOD gives the value of remainder, for example, $Y \leftarrow 10$ MOD 3 give the
value $Y=1$.
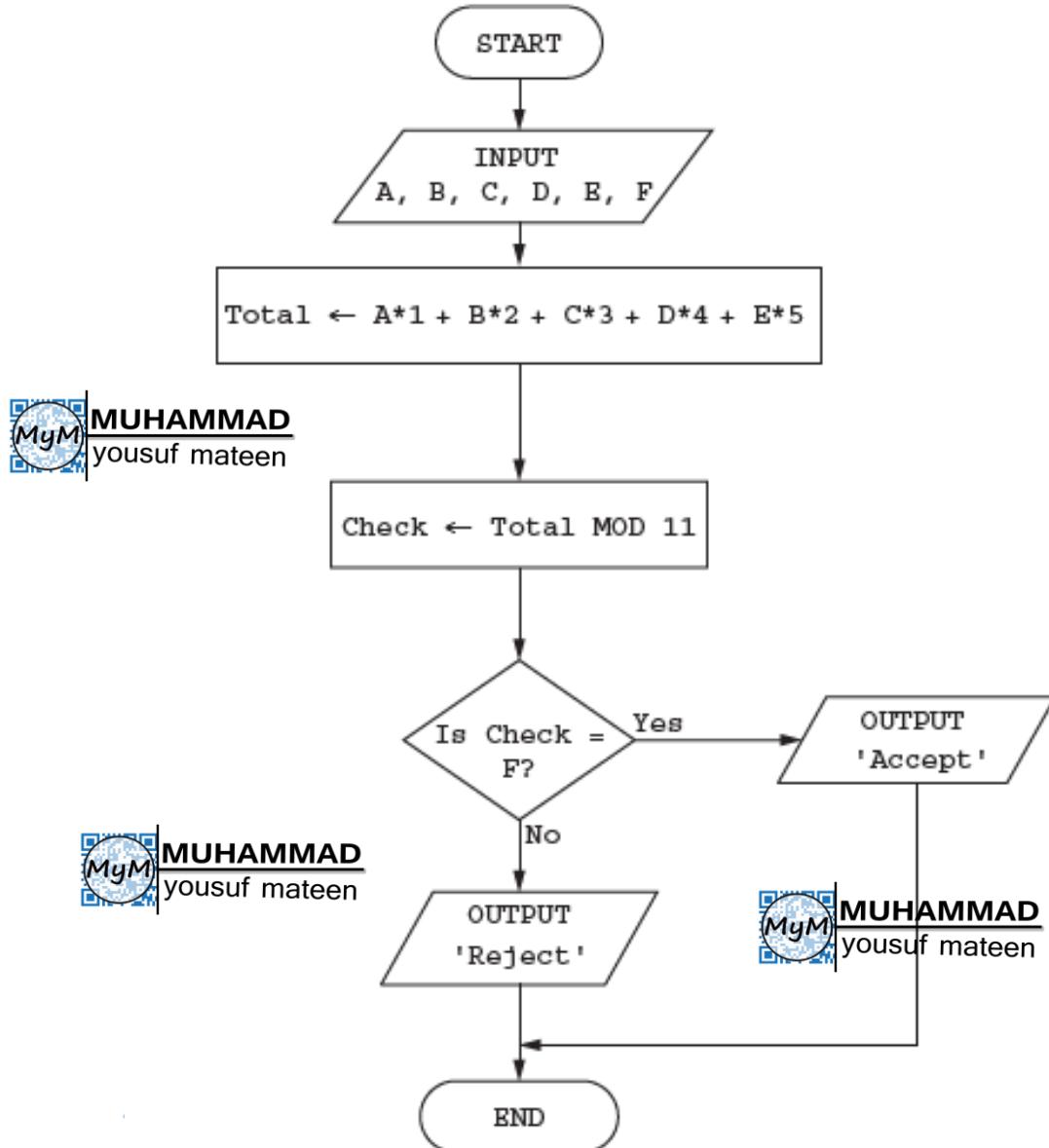
Complete a trace table for each of the two sets of input data.

Set 1   5, 2, 4,3,1,5

Set 2   3, 2, 1,0,7,3

Trace table set 1

5, 2, 4,3,1,5

A	B	C	D	E	F	Total	Check	Output

Trace table set 2

3, 2, 1,0,5,3

A	B	C	D	E	F	Total	Check	Output

[4]

(a) State the purpose of flowchart in **part (a).**

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……………………………………………………………………………………… [1]

(b) Identify a problem with this flowchart and explain how to correct it.

Problem …….…………………………………………………………………………

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Solution ……………………………………………………………………………………

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.... [3]

(May/June 2016)

Q 3 The flowchart below inputs the height of children who want to ride on rollercoaster. Children under 1.2 meters are rejected. The ride starts when eight children have been accepted.
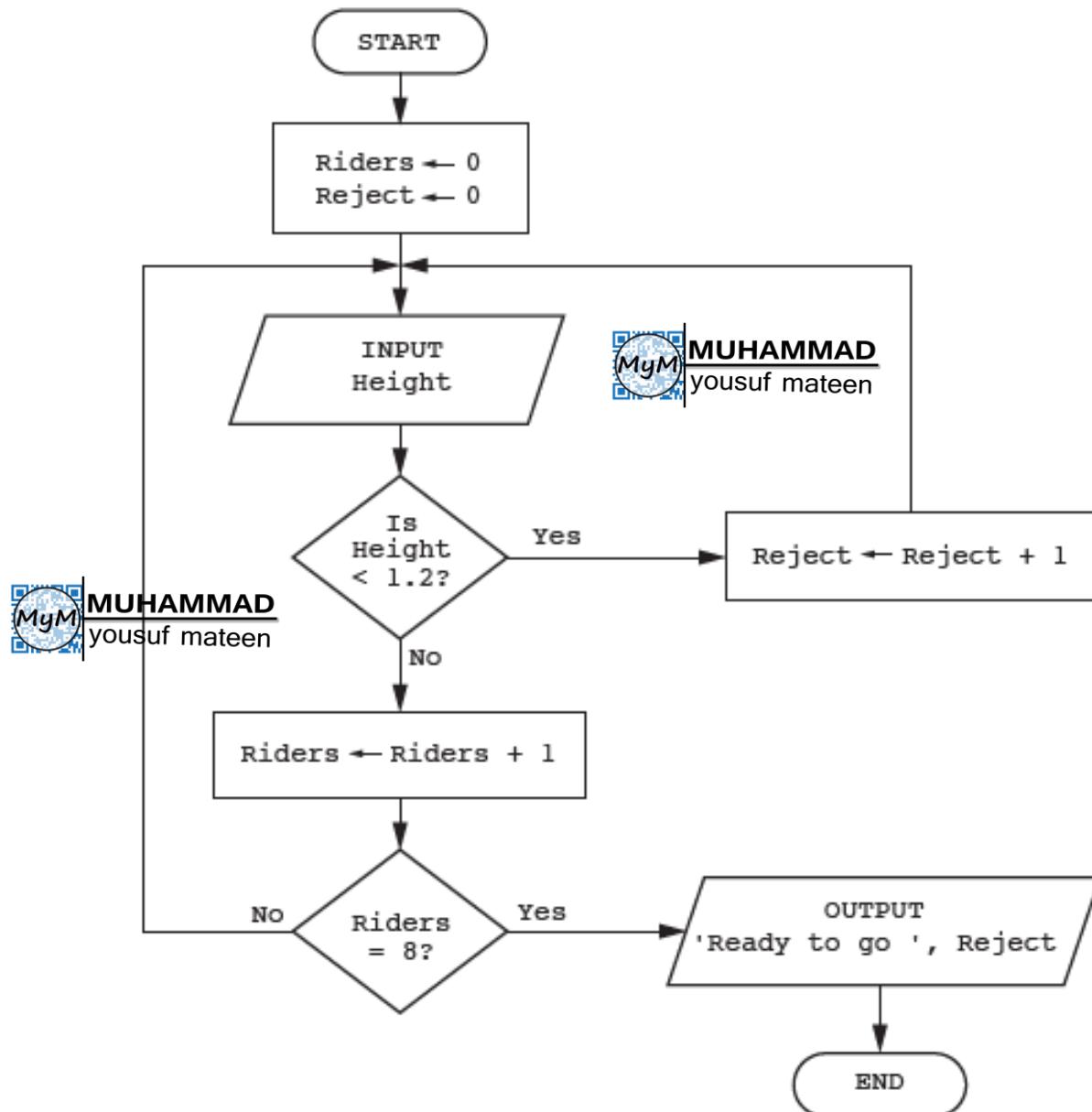
Complete the trace table for the input data.
1.4, 1.3, 1.1, 1.3, 1.0, 1.5, 1.2, 1.3, 1.4, 1.3, 0.9, 1.5, 1.6, 1.0

Riders	Reject	Height	OUTPUT

[4]

Q 4 The flowchart below calculates the number of tins of paint required to pain walls. The flowchart inputs the height and width of a wall in meters, the number of doors and the number of windows. A value of -1 for the height stops the input.

```
                        ┌─────────────┐
                        │    START     │
                        └──────┬──────┘
                               │
                        ┌──────▼──────┐
                        │  Area ← 0    │
                        │  Tins ← 0    │
                        └──────┬──────┘
                               │
                      ┌────────▼────────┐
                      │ INPUT Height,    │
                      │ Width, Doors,    │
                      │ Windows          │
                      └────────┬────────┘
                               │
                          ┌────▼────┐      Yes     ┌──────────────────────────┐
                          │   Is     │─────────────►│ Tins ← INT(Area/10 + 0.5)│
                          │ Height   │              └────────────┬─────────────┘
                          │ = −1?    │                           │
                          └────┬────┘                            │
                               │ No                       ┌──────▼──────┐
                  ┌────────────▼────────────┐             │ OUTPUT Tins  │
                  │ Area ← Area + Height *   │             └──────┬──────┘
                  │ Width − Doors * 1.5 −    │                    │
                  │ Windows                  │              ┌──────▼──────┐
                  └────────────┬────────────┘              │     END      │
                               │                           └─────────────┘
                               └──── (loop back)
```
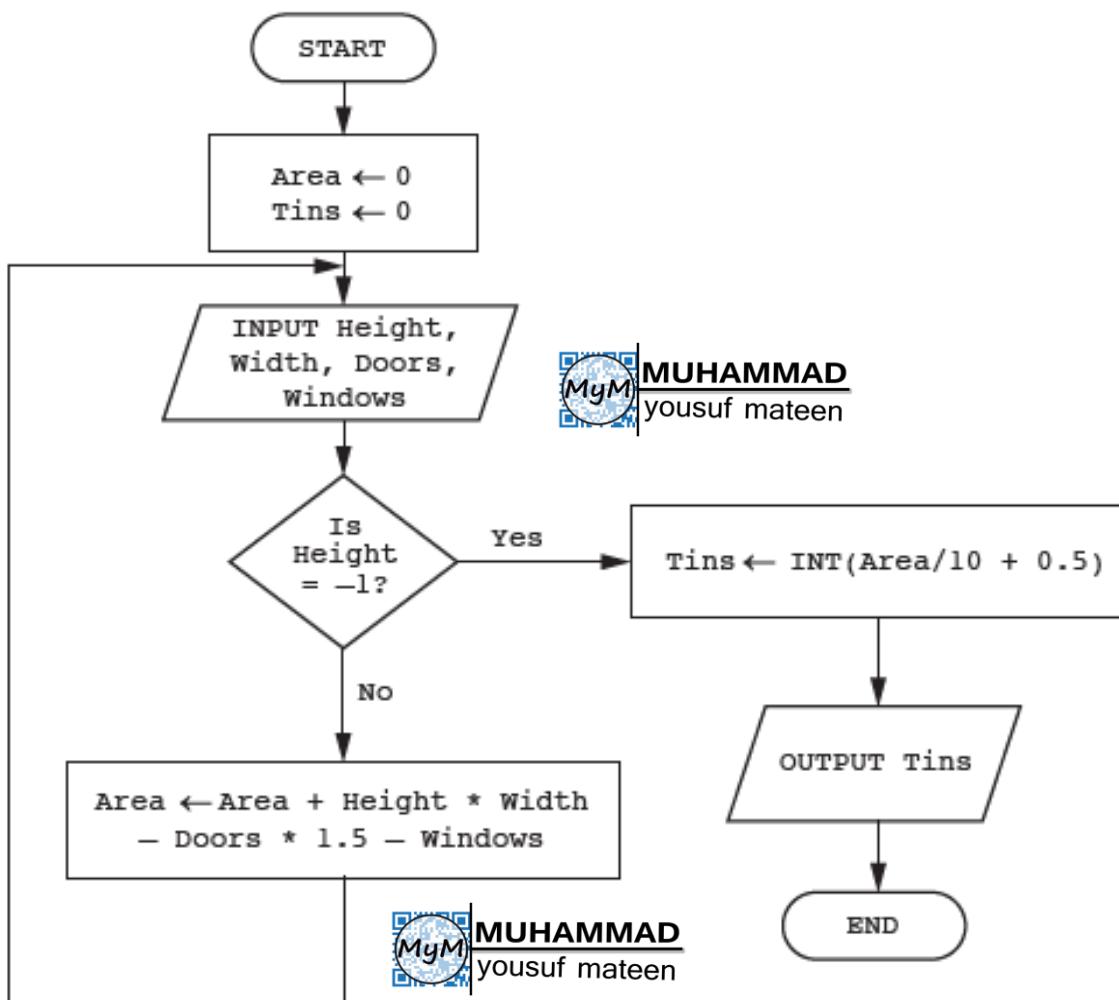
Complete the trace table for the input data:
3,5,1,0,,3,7,0,0,,3,5,0,3,3,7,1,1,-1,0,0,0

Area	Tins	Height	Width	Doors	Windows

[4]

(OCT/NOV 2015)

Q 5 The flowchart below inputs an integer. The predefined function `DIV` gives the value of the division, for example $Z \leftarrow 11 \ Div \ 3$ gives the value Z=3. The predefined function `MOD` gives the value of the remainder, for example $Z \leftarrow 11$ MOD 3 gives the value Z=2.
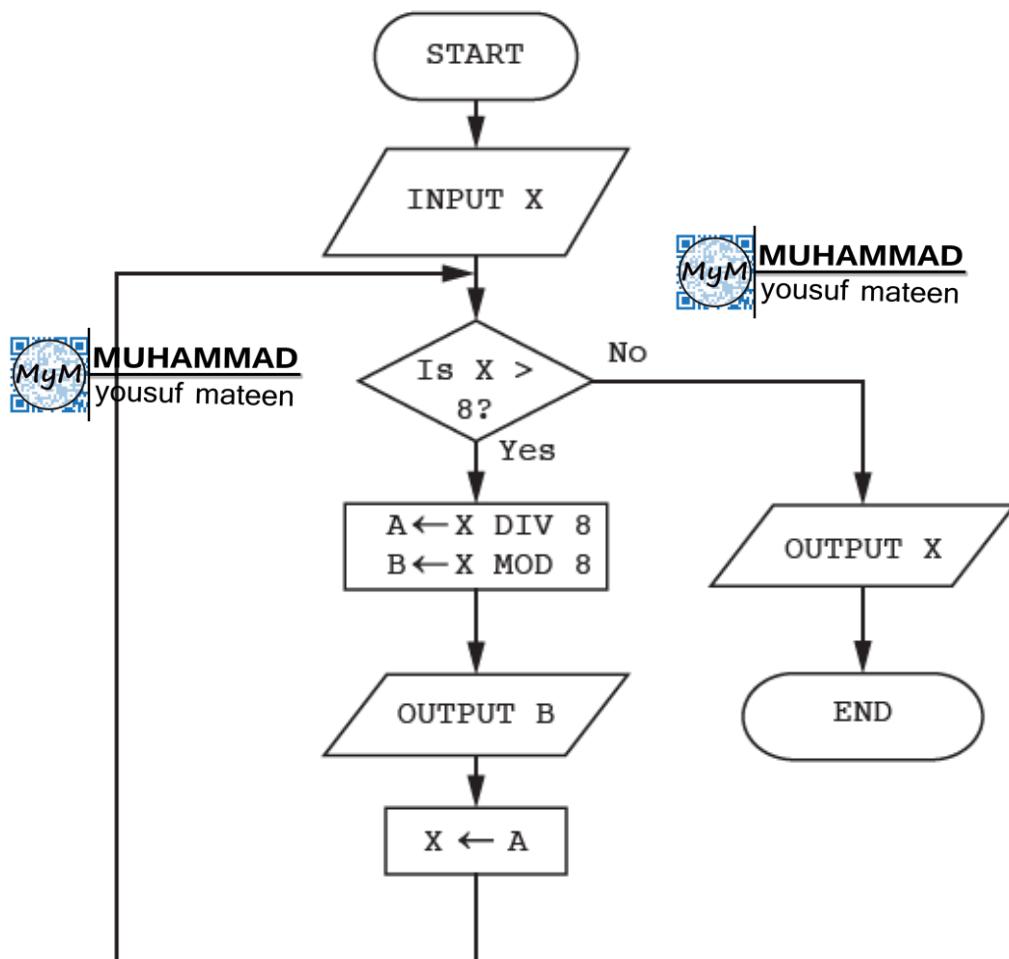
Complete a trace table for each of the two input values **33** and **75.**

Trace table for input value **33**

X	A	B	OUTPUT

Trace table for input value **75**

X	A	B	OUTPUT

Q 6 The flowchart below inputs the price of an item under $10. The change from a $10 note is output. Any amount less than 5 cents is rounded up to 5 cents. The predefined function INT rounds a number down to the nearest whole number, for example $Z \leftarrow$ INT (5.7) gives the value Z=5.

```
                        START

                     INPUT Price

               Change ← 10 − Price

                                Yes
              Is Change >= 1?  ───────→  Dollars ← INT(Change)

                    │No                           │
                    │                             ▼
                    │              Change ← Change − INT(Change)
                    │                             │
                    │                             ▼
                    │←──────────────  OUTPUT Dollars, " dollars"

                                Yes
              Is Change >= 0.5? ──────→  Change ← Change − 0.5

                    │No                           │
                    │                             ▼
                    │←──────────────  OUTPUT "One 50 cent coin"

          TenCents ← INT(Change * 10 + 0.5)

                         │
                         ▼
              OUTPUT TenCents, " ten cent coins"

                                Yes
         Is Change*10 − TenCents > 0? ──────→  OUTPUT "One 5 cent coin"

                    │No                           │
                    │←─────────────────────────────┘
                    ▼
                        END
```
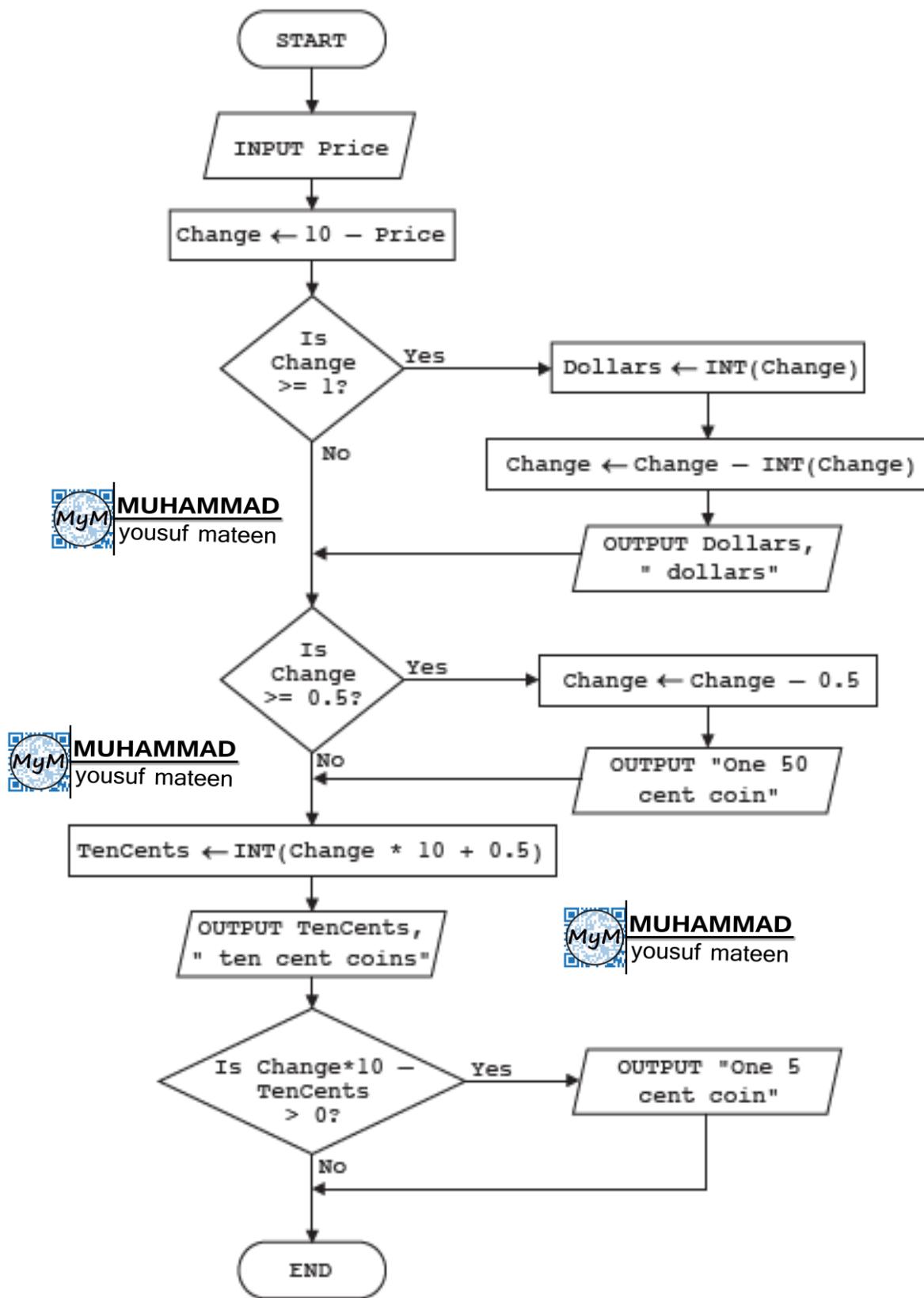
Complete the trace table for the input data: 6.29

| Price	Change	Dollars	TenCents	OUTPUT

[5]

(may/june 2017)

Q 7 This flowchart inputs a range of temperatures in degrees Fahrenheit.
As each temperature is input, it is compared with the previous highest temperature. If it is higher than the current highest, it replaces the previous highest temperature and then it is converted to degrees Celsius.

For ease of calculation, the final step of the Fahrenheit to Celsius conversion has been approximated as division by 2.
When –1 is entered, the input process stops and the highest temperature (in both Fahrenheit and Celsius) is output.

```
                              START
                                │
                                ▼
                     ┌──────────────────────┐
                     │ HighF ← -100         │
                     │ HighC ← -100         │
                     └──────────────────────┘
                                │
                                ▼
                        ╱────────────╲
                       │ INPUT TempF  │
                        ╲────────────╱
                                │
                                ▼
                          ◇ Is TempF ◇ ──No──►  ◇ Is TempF ◇ ──No──►
                          ◇  = -1?   ◇          ◇ > HighF?  ◇
                                │                    │
                               Yes                  Yes
                                │                    ▼
                                │            ┌──────────────────┐
                                │            │ HighF ← TempF    │
                                │            └──────────────────┘
                                │                    │
                                │                    ▼
                                │            ┌──────────────────────┐
                                │            │ HighC ← (TempF-32)/2 │
                                │            └──────────────────────┘
                                ▼
          ╱──────────────────────────────────────────╲
         │ OUTPUT 'The highest temperature is, ',      │
         │        HighF, ' Fahrenheit, ',              │
         │        HighC, ' Celsius.'                   │
          ╲──────────────────────────────────────────╱
                                │
                                ▼
                              END
```
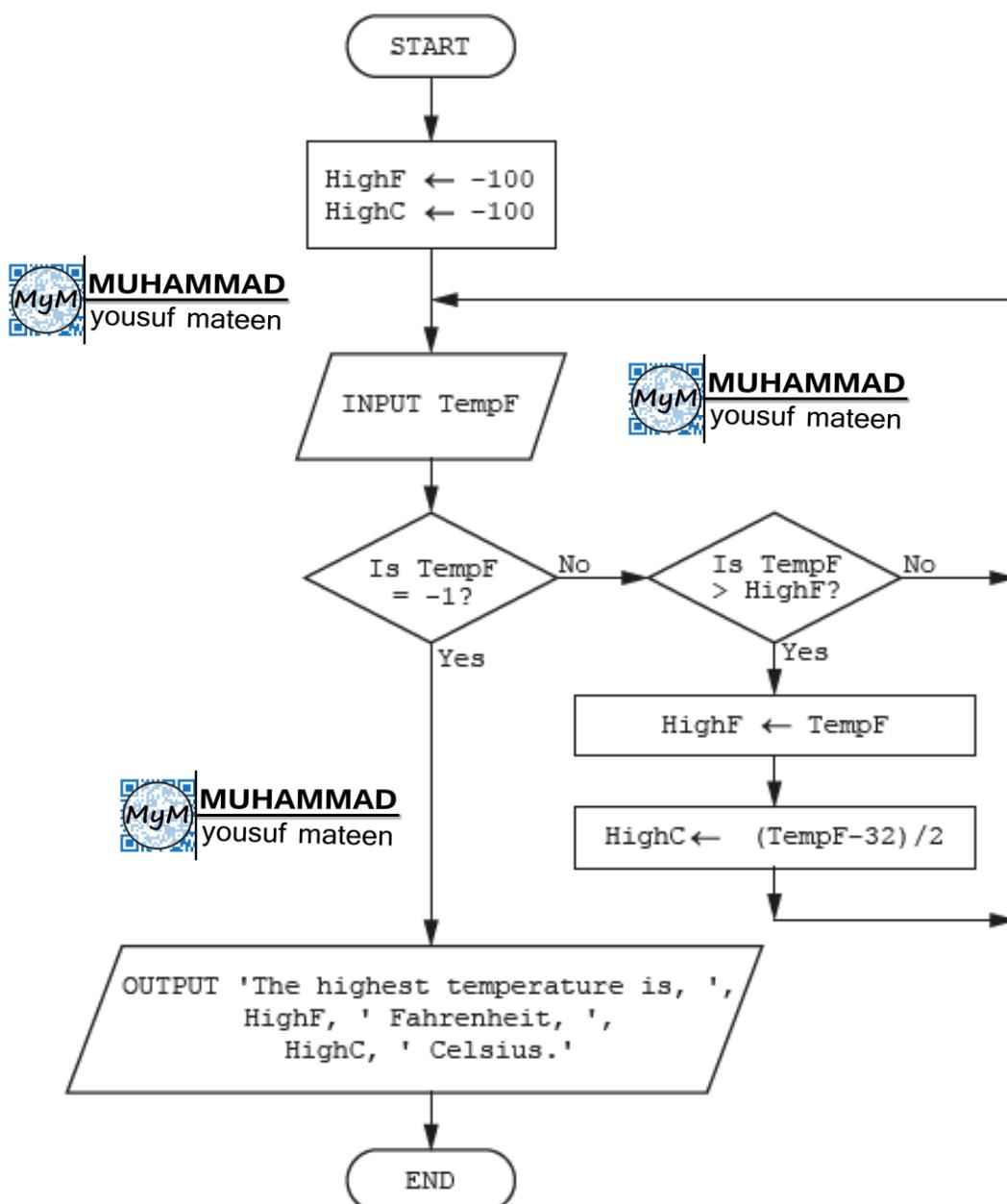
Complete the trace table for the input data.

68, 46, 50, 86, 65, 50, 40, 30,-1

HighF	HighC	TampF	OUTPUT

[5]

Q 8 This flowchart inputs the weight of items in kilograms to be loaded on a trailer. Any item over 25 kilograms is rejected. The trailer can take up to 100 kilograms.
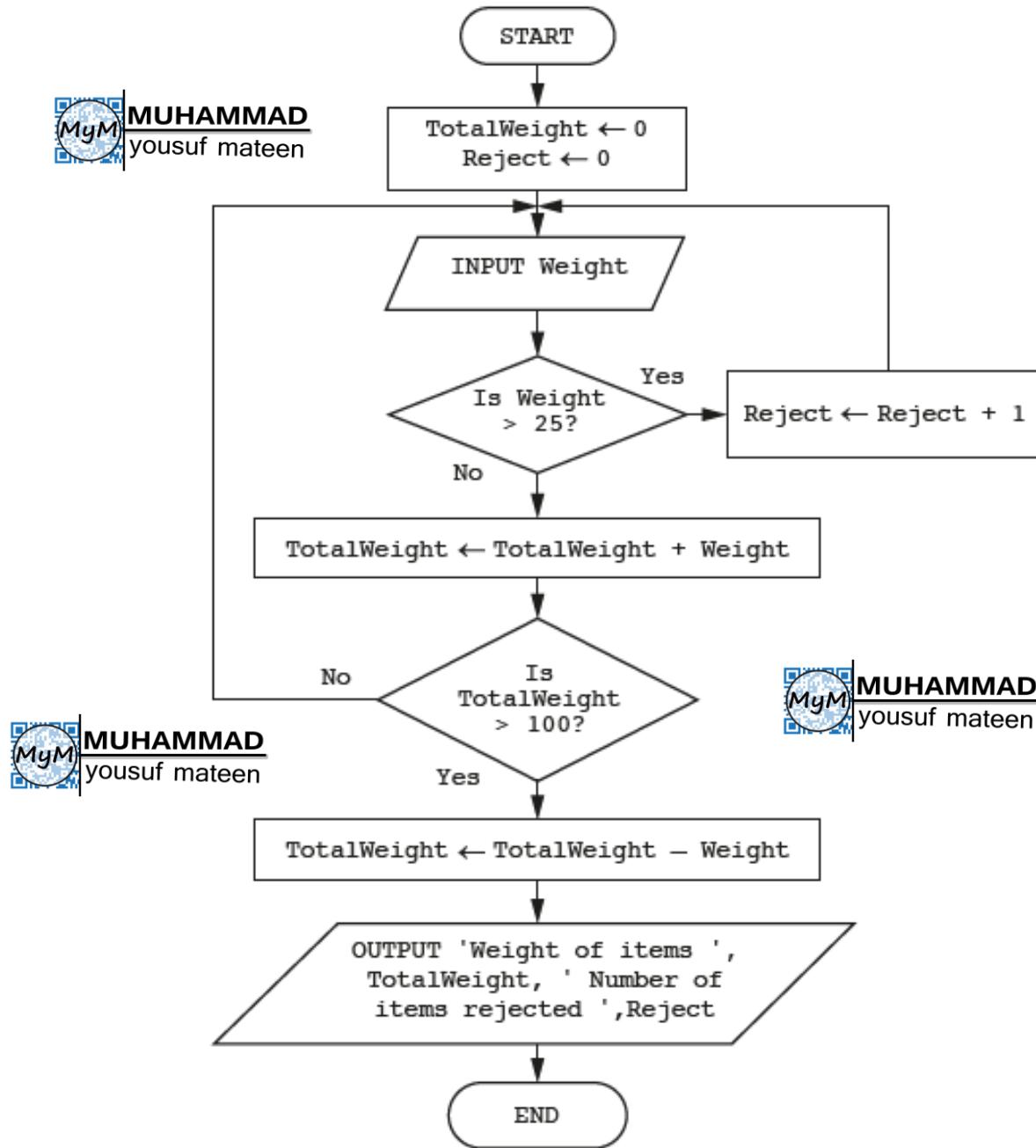
Complete the trace table for the input data.

13, 17,26,25,5,10,15,35,20,15

Weight	Reject	TotalWeight	OUTPUT

[5]