Nested if-else statement

More than two possibilities …

- In an exam, we may have only two outcomes (pass or fail).
- Sometimes, life has more than two possibilities. For example,
  - Signals of a traffic light
  - Even an exam can have A, B, C, D, F grades.
  - Household income

Nested if-else: traffic light

Check the state of traffic light, if it is green, then print out “go!”; if it is red, then print out “stop.”; if it is yellow, then print out “slow down.”.

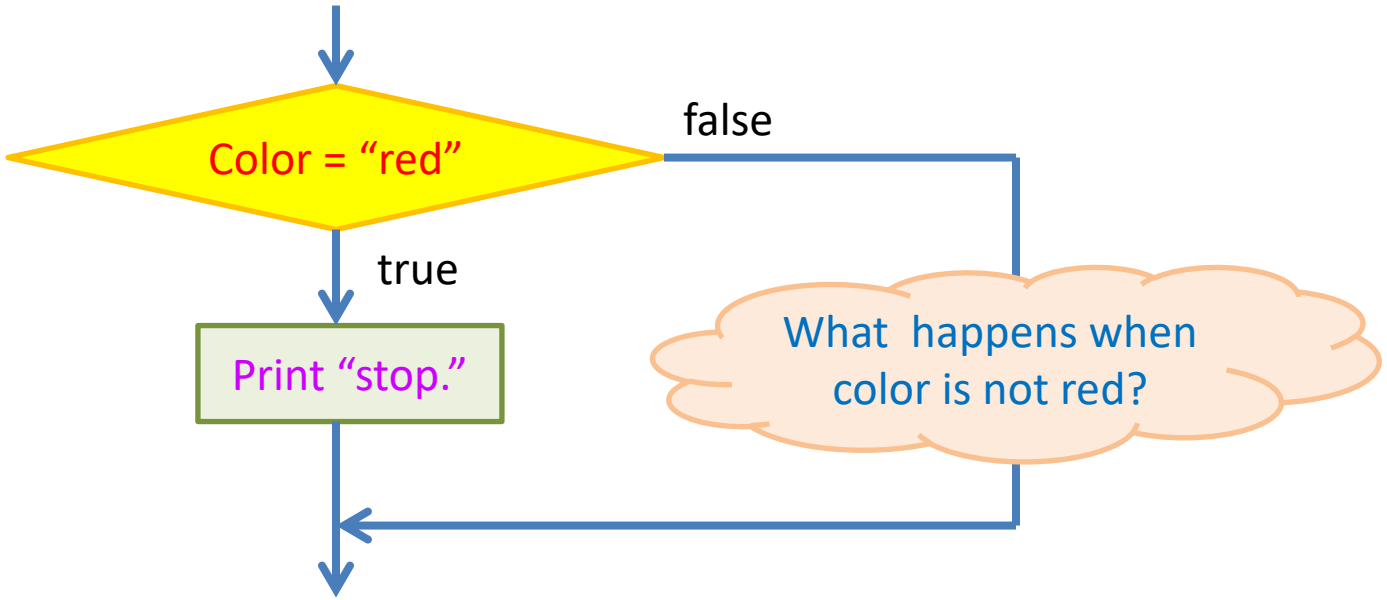
Print “stop.” if color is red

Print “slow down.” if color is yellow

Print “go!” if color is green

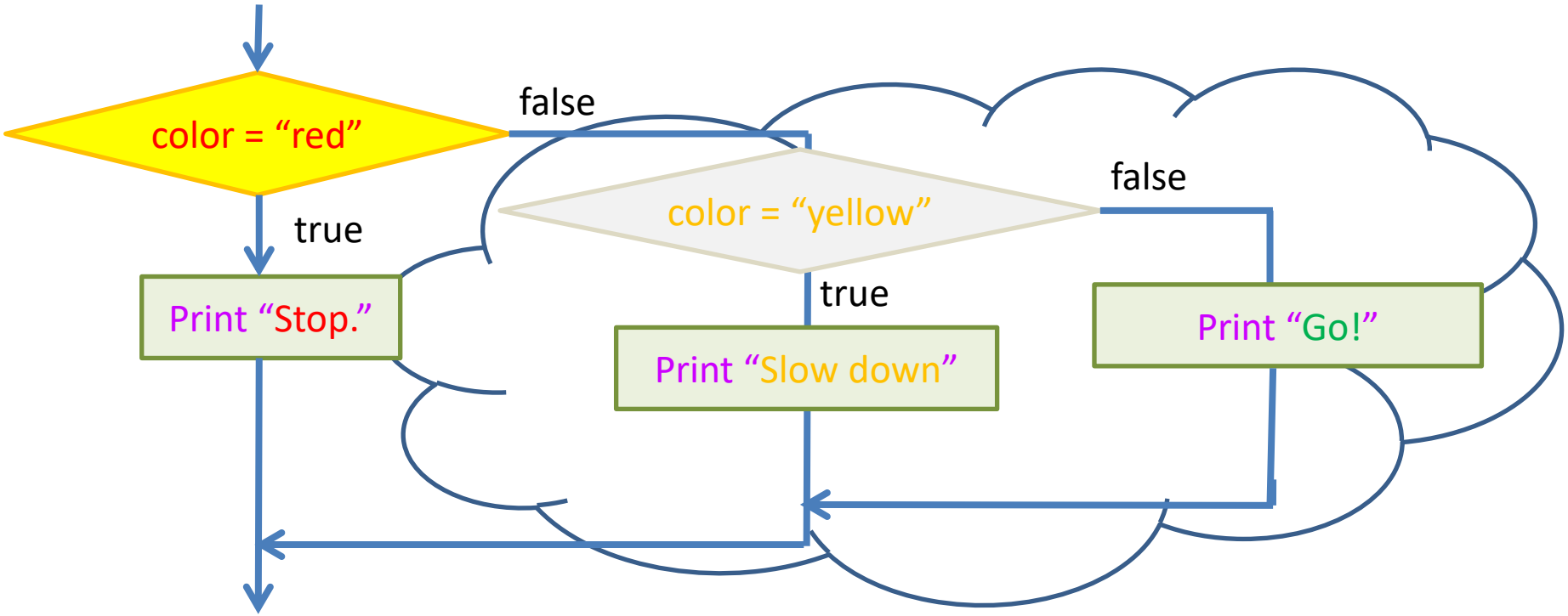
Nest if-else traffic light

A traffic light has three possible colors: red, green, and yellow.



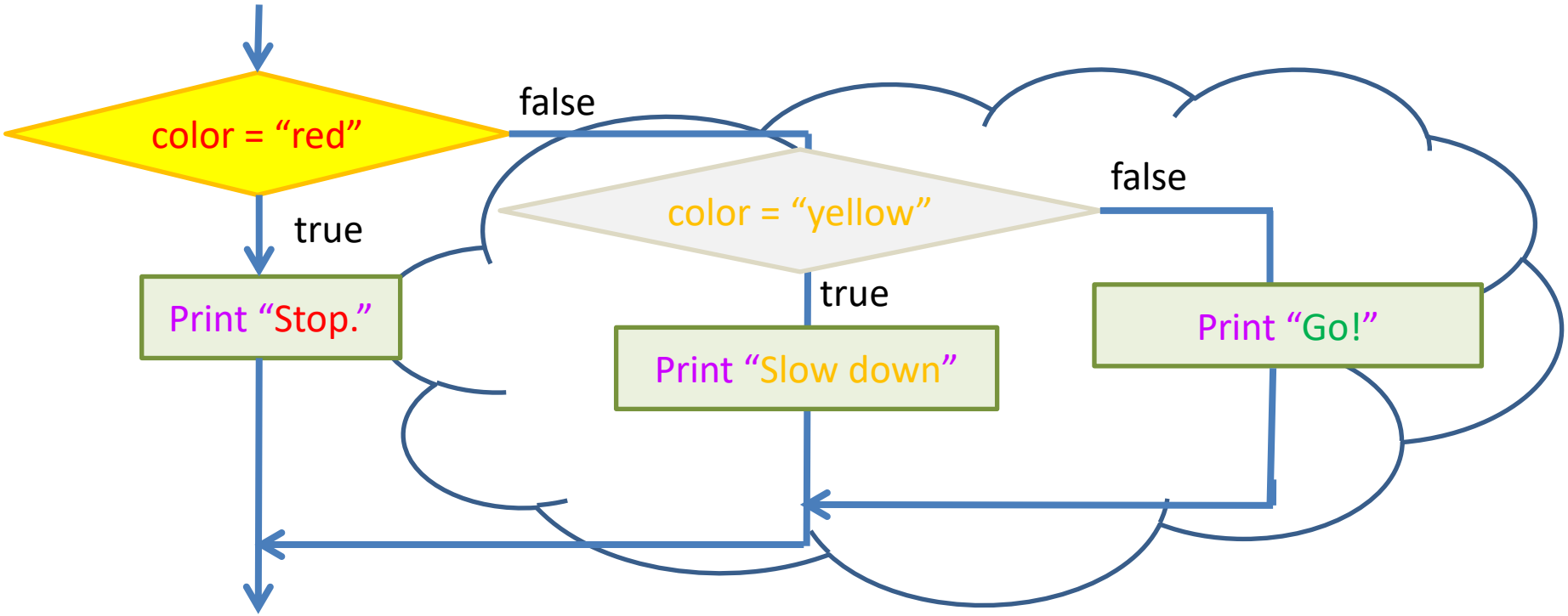
Nest if-else traffic light: II

A traffic light has three possible colors: red, green, and yellow.



Nest if-else traffic light: III

Translate the following chart into code (Hint: cloud part first. What kind statement is it?)



Nested if-else

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Print "stop." if color is red

Print "slow down." if color is yellow

Print "go!" if color is green

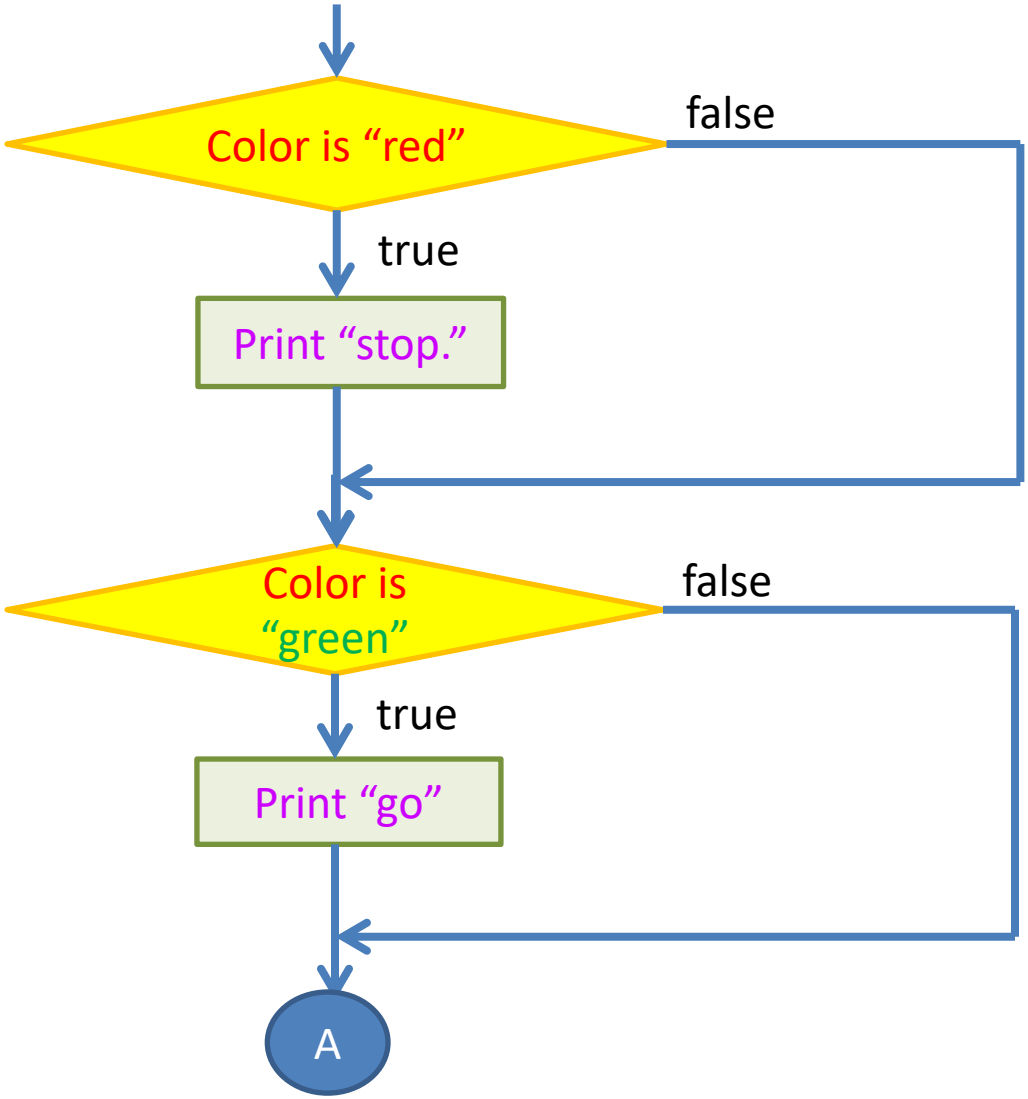
The above cases can be written as

if color is red, then print "stop."

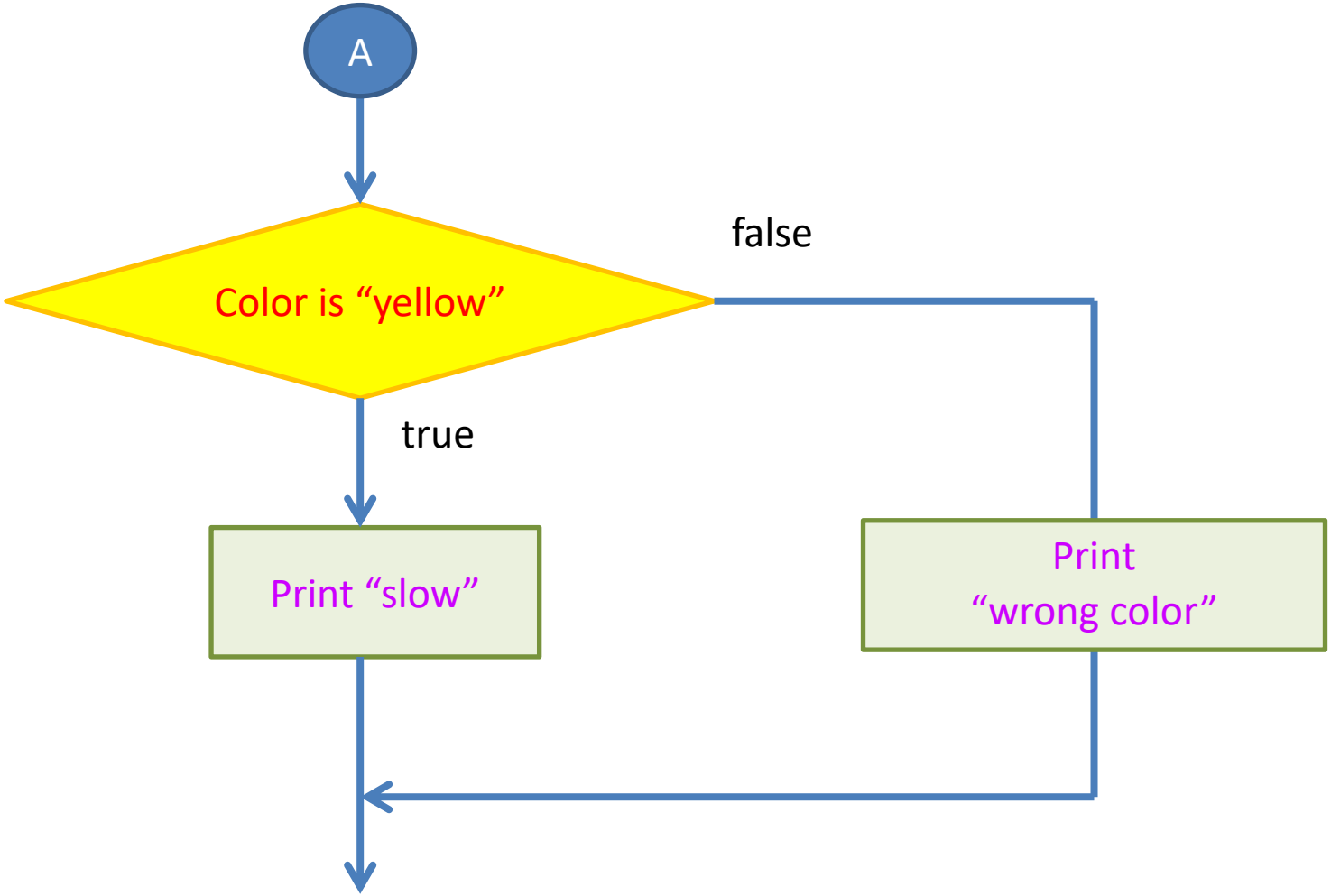
Otherwise (the color is not red, it can be yellow or green)

- if color is yellow, then print "slow down."
- Otherwise (the color is neither red nor yellow, it must be green) Print "go!"

Flow chart of separated if or if-else



Flow chart of separated if or if-else: II



Conclusion: use nested if-else to categorize

- For cases like more than two branches, we use nested if-else statement.
- The inner-most else normally does not have if-part followed. You can think it as all the rest or miscellaneous situation.

traffic light

red green yellow any other color

Goldilocks

- The first bed is too hard
- The second bed is too soft
- The third bed is just right

```
if (the bed is too hard)
    print “The bed is too hard”
else if (the bed is too soft)
        print “The bed is too soft”
      else print “just right”
```

- The left hand side is just pseudo code.
- We can use number 1-3 to indicate the softness of bed.

Nested-if-else: Compare Two Numbers

Enter two numbers from the keyboard and find out whether they are equal or not; if not, which one is bigger.

How many possible comparison results?

If i is not equal to j, what are other possibilities?

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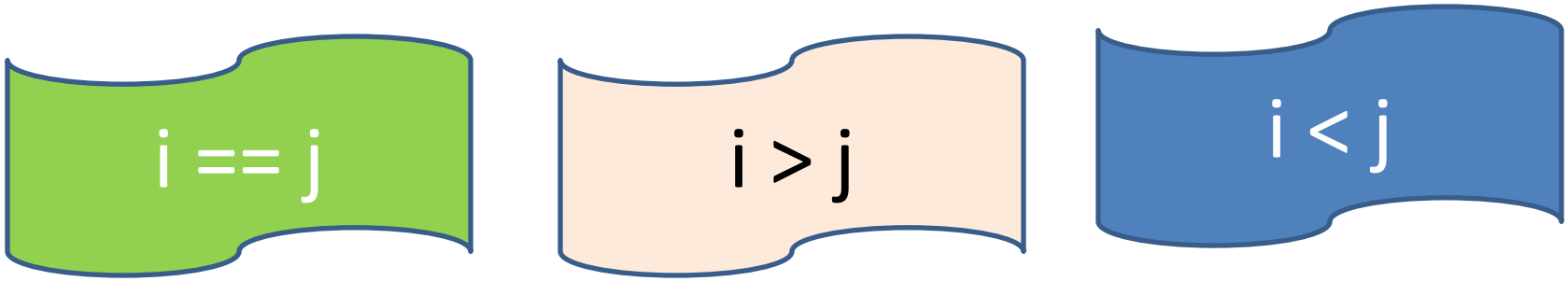

Exercise: ticket price

- Suppose a park has the following ticket policy.

- Write a program to enter age from the keyboard, then decide the price based on age and print out the price to the screen.

Enter a score, find letter grade

Enter a score in [0, 100], find the corresponding letter grade. For example:

90 and above: ‘A’

80 above but lower than 90: ‘B’

…

Get letter grade

```
//Todo: Enter score.  Your code goes next…
if (score >= 90)
   cout << "Grade = A";

// Q1: Do we need to handle when scores < 90?
// Q2: Are we sure what letter grade it is?
//Todo: your code goes next…
```

Get letter grade: peel an onion