Control Flow

Old Enough To Drive?

```
>>> age = 20
>>> age > 18
True
>>> age = 14
>>> age > 18
False
```

Simple Application

- Ask the user to input his age
- Judge if his older than 17
- Print either
  - "You are old enough to drive" or
  - "You are not old enough to drive"

- Based on a criteria
- If the criteria is true , do A
- Otherwise do B

A sample program

```python
age = int(input("What is your age?"))
if age > 17:
    print("You are old enough to drive")
else:
    print("You are not old enough to drive")
```

Control Flow: Selection

- Branching
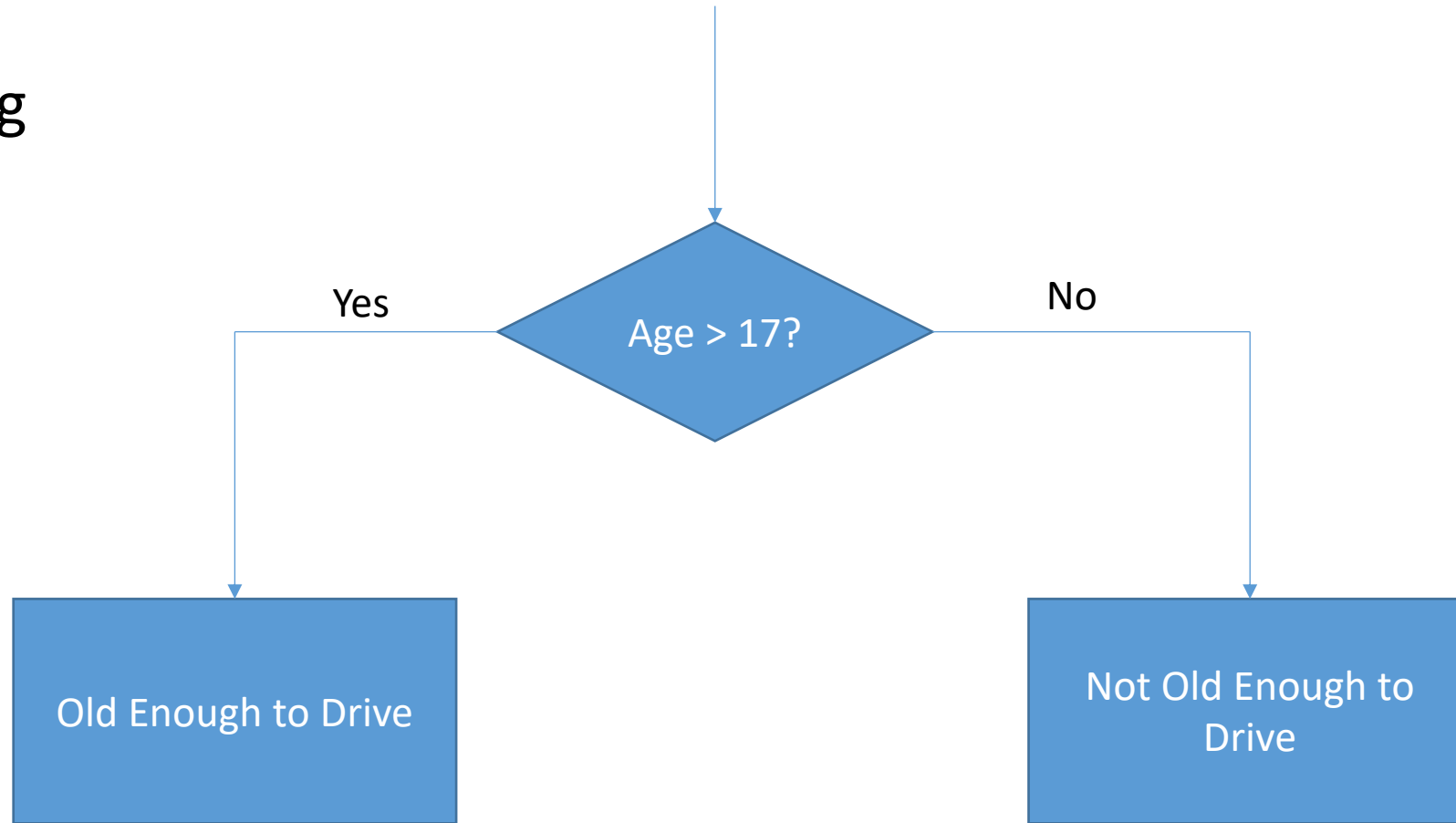
Exercise: Bank Balance

- Ask the user how much he wants to deposit

- Ask the user how much he wants to withdraw

- Either, he has enough money then print
  - You remaining balance is xxxxxx after withdrawal

- Or
  - You do not have enough money

```
How much you want to deposit?
1000
How much you want to withdraw?
123
Your remaining balance is  877
```

```
How much you want to deposit?
8000
How much you want to withdraw?
10000
You do not have enough money
```
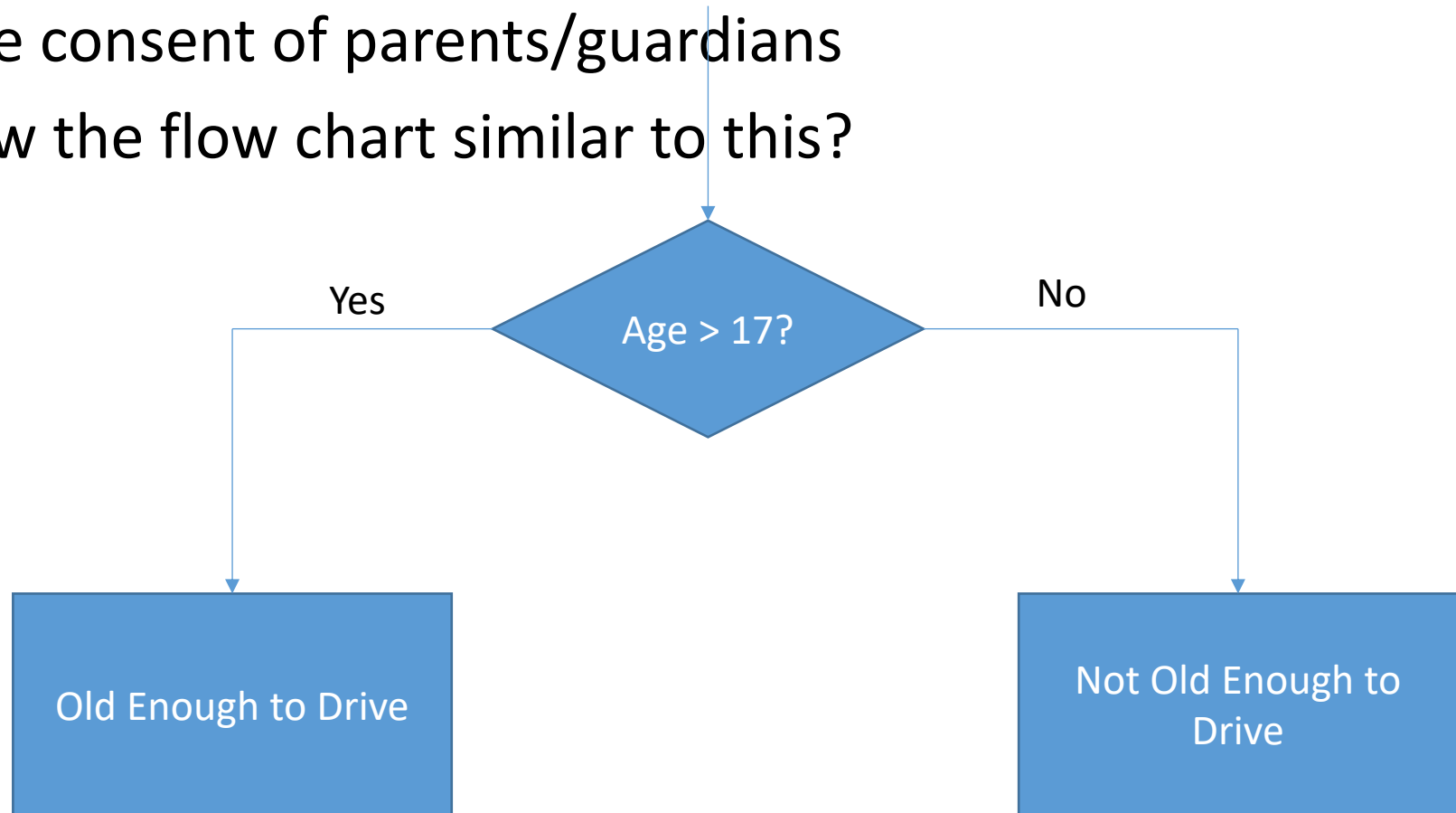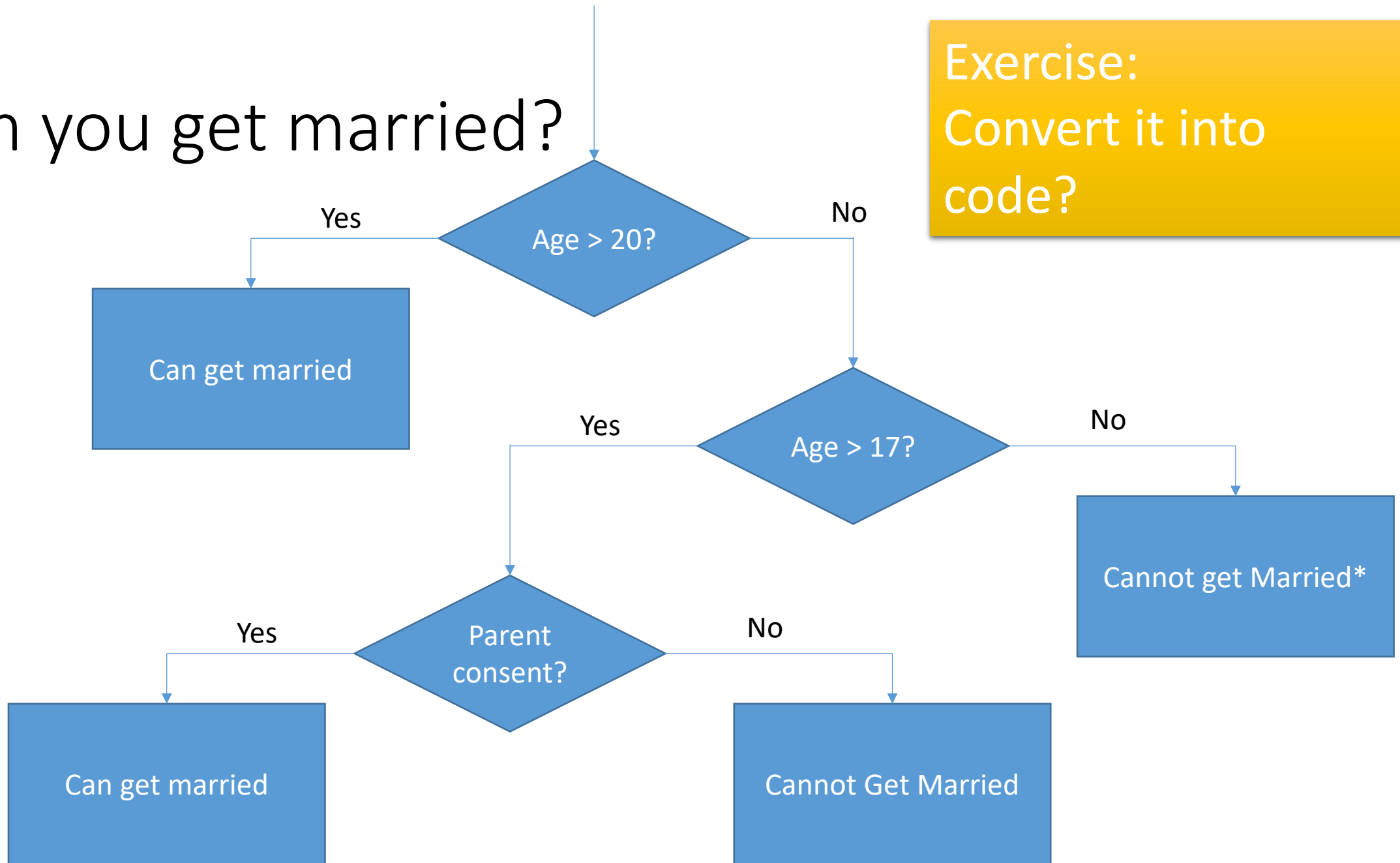
Selections

More Conditions

How old can you get married in Singapore?

- At least 21 yo, or
- At least 18 yo with the consent of parents/guardians
- Exercise: Can you draw the flow chart similar to this?

Yes   **Age > 17?**   No

Old Enough to Drive

Not Old Enough to Drive

Can you get married?

Exercise: Convert it into code?

Age > 20?
- Yes → Can get married
- No → Age > 17?
  - Yes → Parent consent?
    - Yes → Can get married
    - No → Cannot Get Married
  - No → Cannot get Married*

Break it down

Age > 20?

Yes

No

Can get married

Age > 17?

Yes

No

Cannot get Married*

No

```
if age > 20:
    print("You can get married")
else:
    print("I will do it later")
```
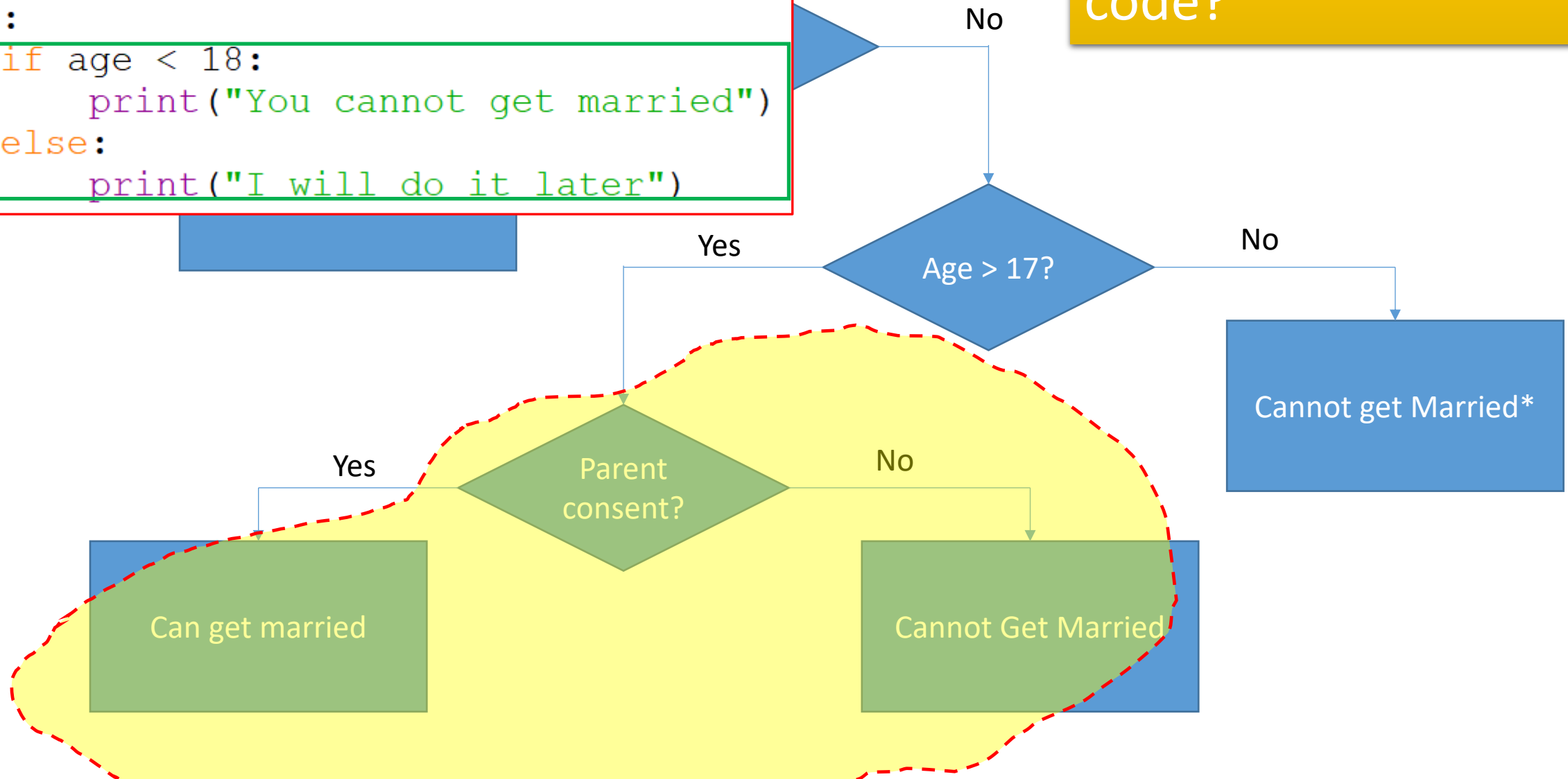
Can get married

Cannot Get Married
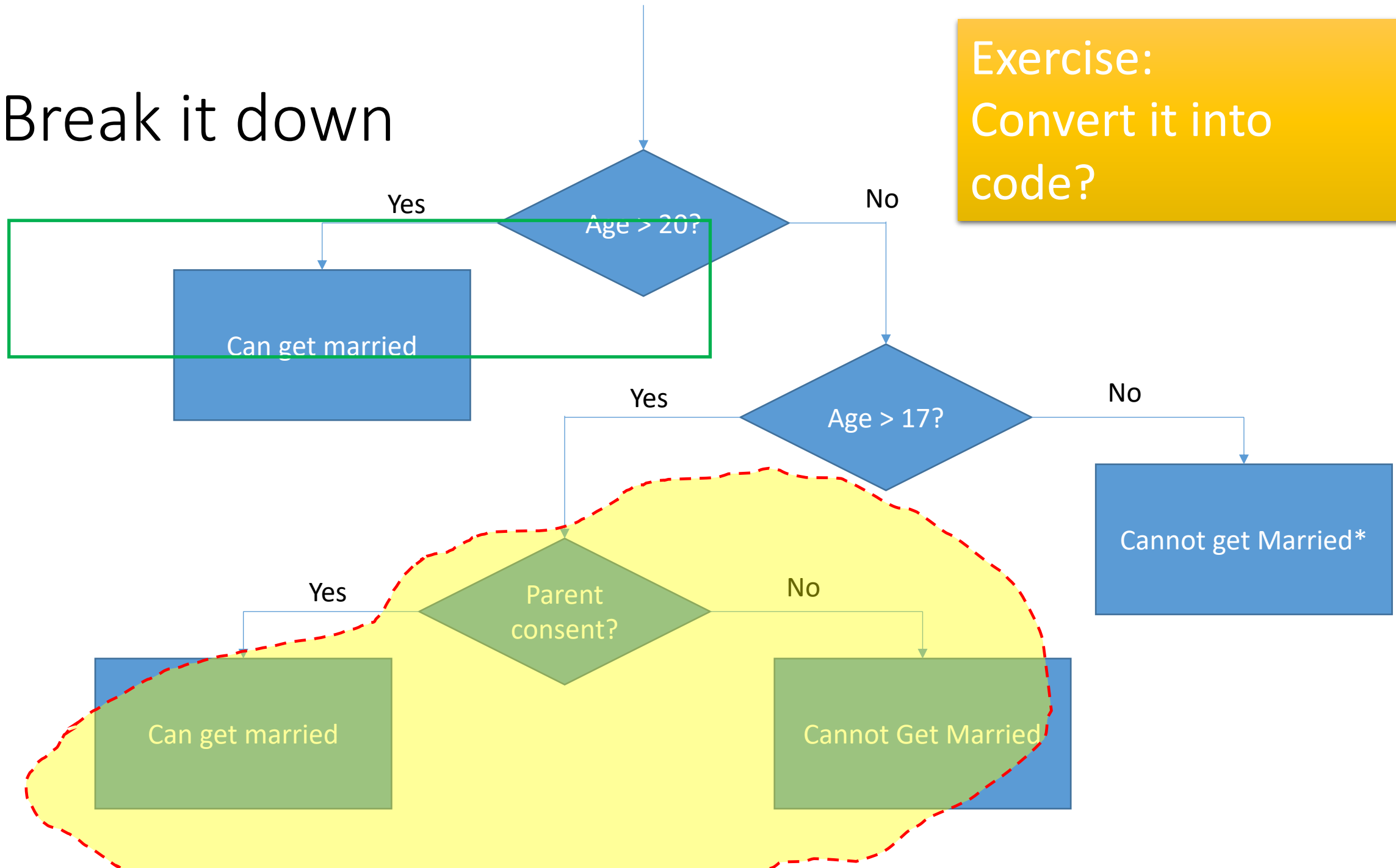
```
if age > 20:
    print("You can get married")
else:
    if age < 18:
        print("You cannot get married")
    else:
        print("I will do it later")
```

Exercise: Convert it into code?

No

Age > 17?

Yes

No

Cannot get Married*

Parent consent?

Yes

No

Can get married

Cannot Get Married

Break it down

Exercise: Convert it into code?

Age > 20?

Yes — Can get married

No

Age > 17?

Yes

No — Cannot get Married*

Parent consent?

Yes — Can get married

No — Cannot Get Married

Complete Code

```python
print("What is your age?")
age = int(input())
print("Do you have your parent consent?(Y/N)")
parent_consent = input()
if age > 20:
    print("You can get married")
else:
    if age < 18:
        print("You cannot get married")
    else:
        if parent_consent == "Y":
            print("You can get married")
        else:
            print("You cannot get married")
```

Exercise: Applying to work in Singapore

- If someone is not a Singaporean and he would like to work in Singapore, he can apply for "passes"
- Basically, the different passes have different monthly salary requirements
  - Employment Pass: at least $5,000
  - S Pass: at least $3,150
  - Miscellaneous Work Pass: Otherwise
- Tasks:
  - Draw a flow chart of the above process
  - Write a piece of code to print out what pass can you get according to the salary as an input

What is your salary?
4000
S Pass

What is your salary?
3000
Misc. Work Pass

What is your salary?
12000
EP

Optimization

Your first version of working code is not the best

Programmers' Code

You can "merge" the "else: if" into "elif"

```python
print("What is your age?")
age = int(input())
print("Do you have your parent consent?(Y/N)")
parent_consent = input()
if age > 20:
    print("You can get married")
else:
    if age < 18:
        print("You cannot get married")
    else:
        if parent_consent == "Y":
            print("You can get married")
        else:
            print("You cannot get married")
```

```python
print("What is your age?")
age = int(input())
print("Do you have your parent consent?(Y/N)")
parent_consent = input()
if age > 20:
    print("You can get married")
elif age < 18:
        print("You cannot get married")
elif parent_consent == "Y":
        print("You can get married")
else:
        print("You cannot get married")
```

Using operators "or"/"and"

- How do you say the following condition in one sentence in English?
  - At least 21 yo, or
  - At least 18 yo with the consent of parents/guardians
- "At least 21 yo or, at least 18 yo and with consent"
- Converting it into one single condition:

```
age > 20 or (age >17 and consent == 'Y')
```

```python
print("What is your age?")
age = int(input())
print("Do you have your parent consent?(Y/N)")
parent_consent = input()
if age > 20 or (age > 17 and parent_consent == 'Y'):
    print("You can get married")
else:
    print("You cannot get married")
```

Exercise: Applying to work in Singapore

- If someone is not a Singaporean and he would like to work in Singapore, he can apply for "passes"
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Optimize it with different versions!!!