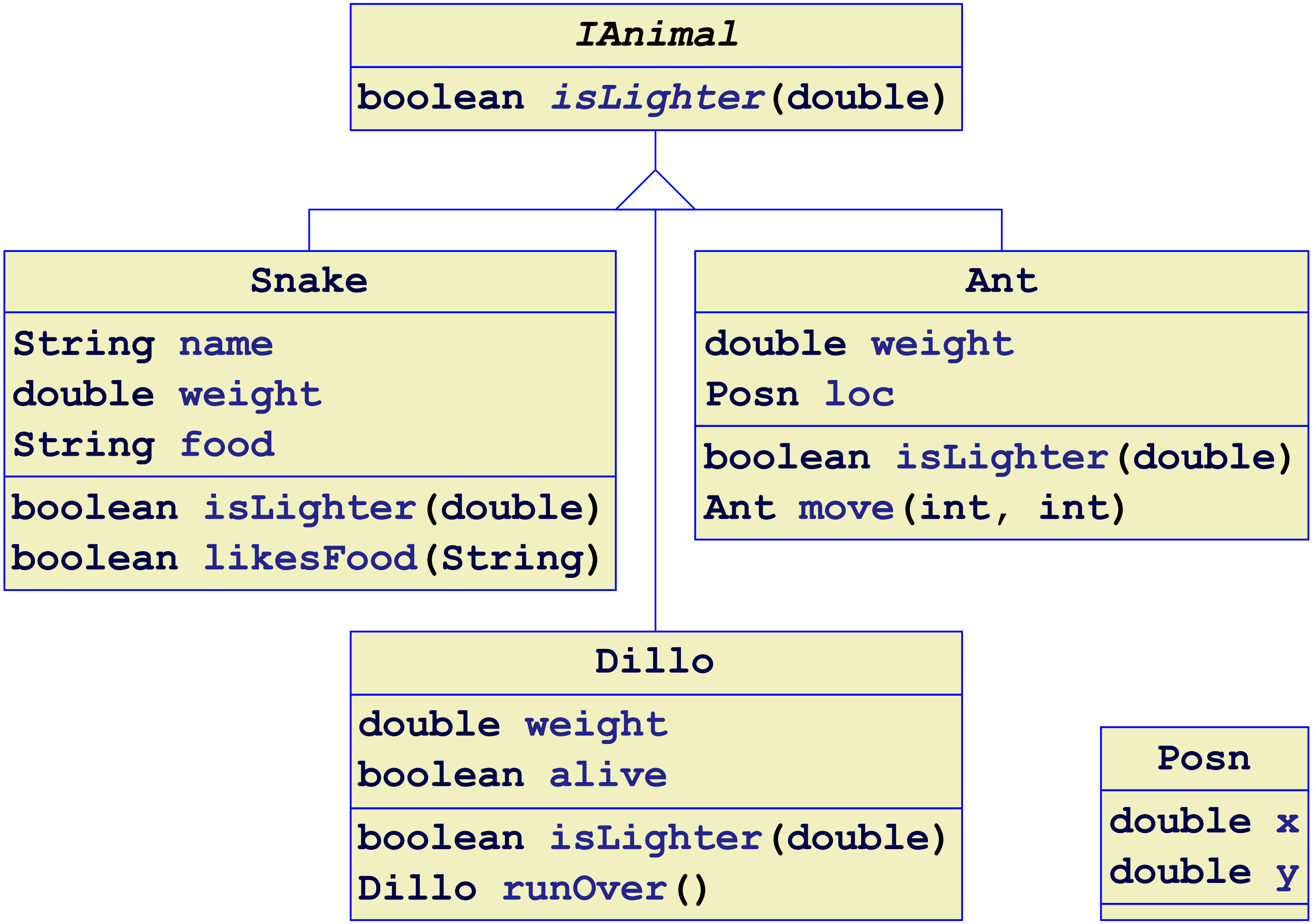
- **Class Diagrams**
- **Example Continued**

Animal Classes



IAnimal

boolean *isLighter*(double)

Snake

String name
double weight
String food

boolean isLighter(double)
boolean likesFood(String)

Ant

double weight
Posn loc

boolean isLighter(double)
Ant move(int, int)

Dillo

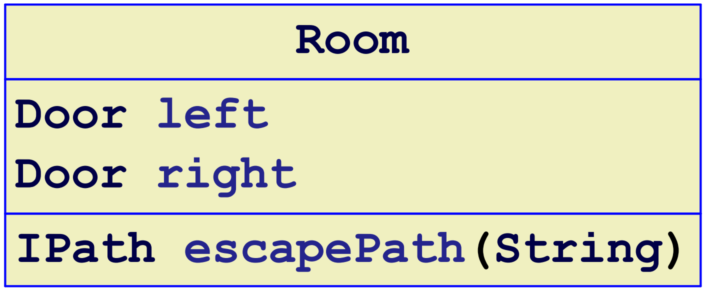
double weight
boolean alive

boolean isLighter(double)
Dillo runOver()

Posn

double x
double y

Room Class

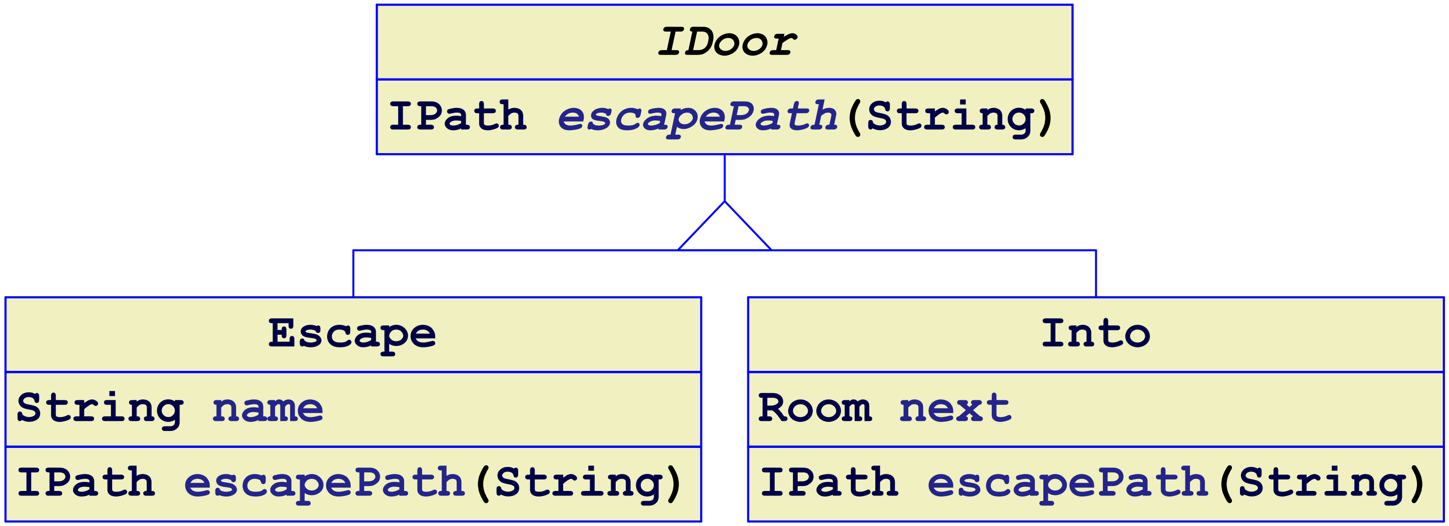


Room

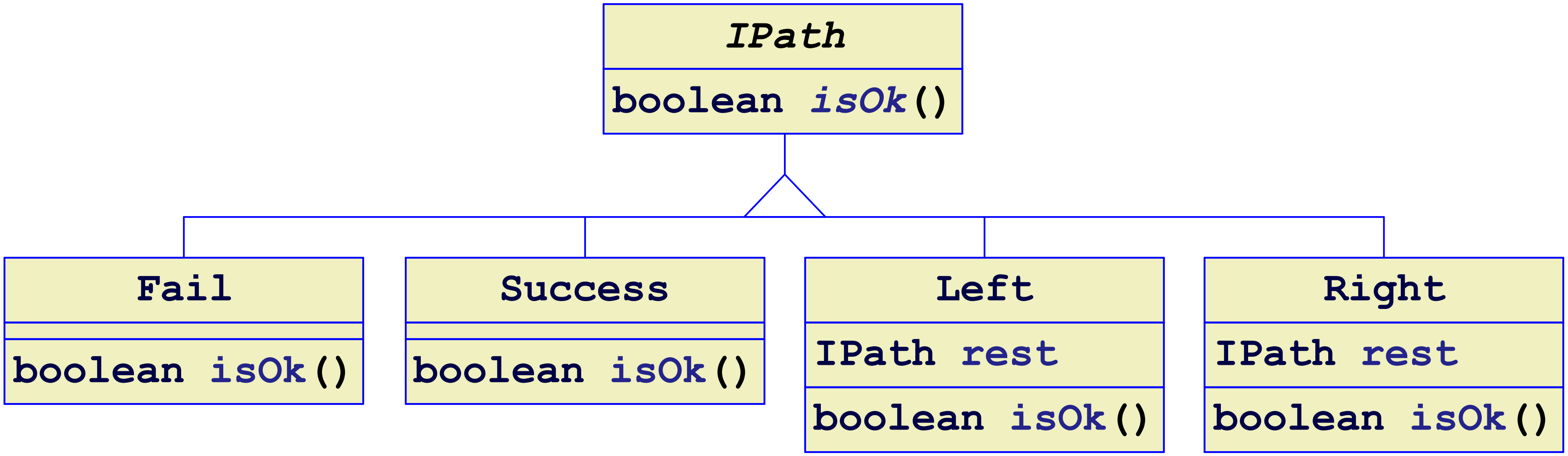
Door left
Door right

IPath escapePath(String)

Door Classes



Path Classes



- Class Diagrams
- Example Continued

Door Variations and Person Attributes

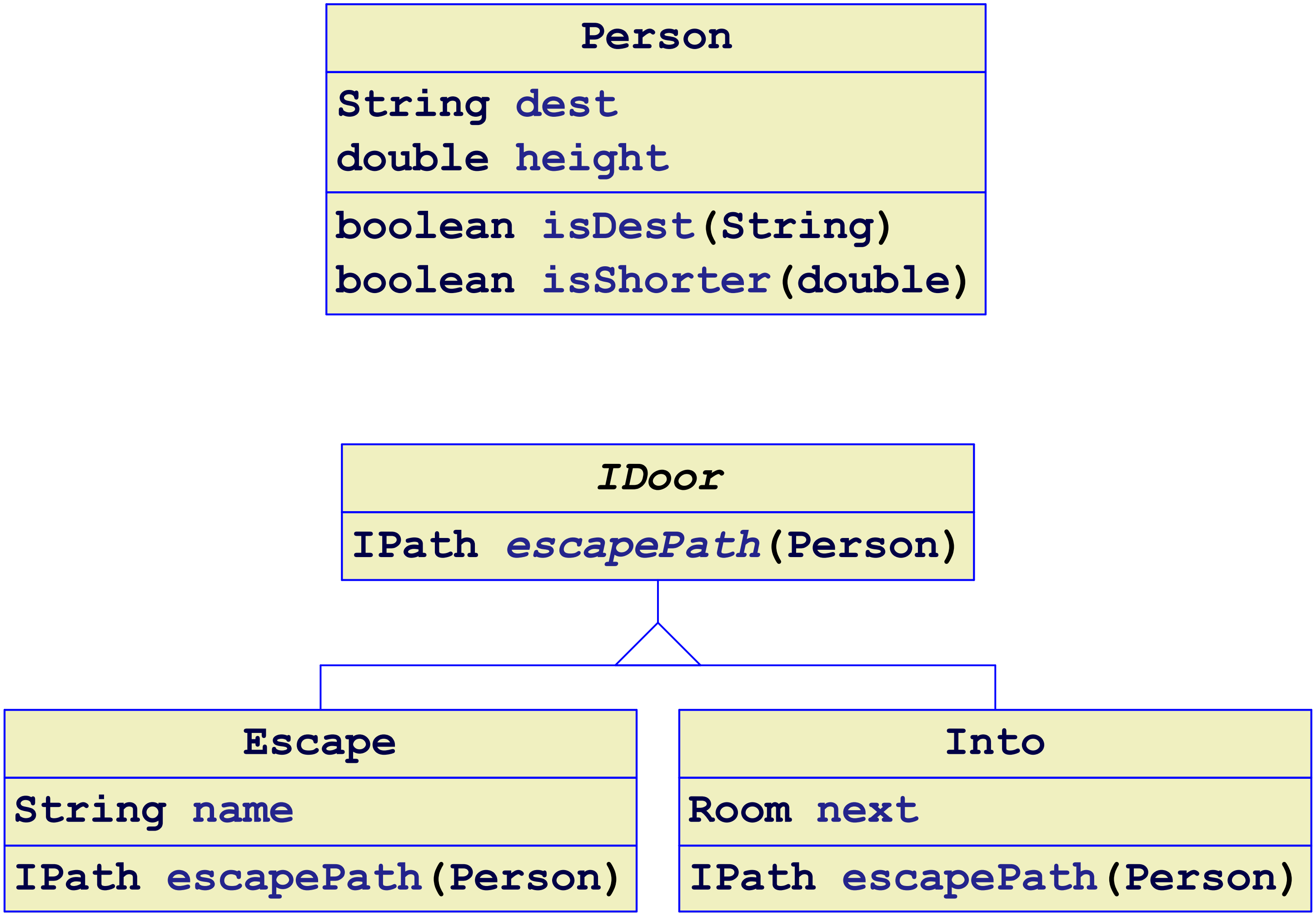
Eventually, we want locked doors, short doors, magic doors, and other kinds of doors

Finding an escape will depend on having keys, being a certain height, etc.

Instead of adding more and more arguments to **`escapePath`**, let's introduce a **`Person`** to carry attributes

Replace the destination-string argument of **`escapePath`** with a **`Person`** argument, where a **`Person`** has a destination and height

Door Classes



Person

String dest
double height

boolean isDest(String)
boolean isShorter(double)

IDoor

IPath *escapePath*(Person)

Escape

String name

IPath escapePath(Person)

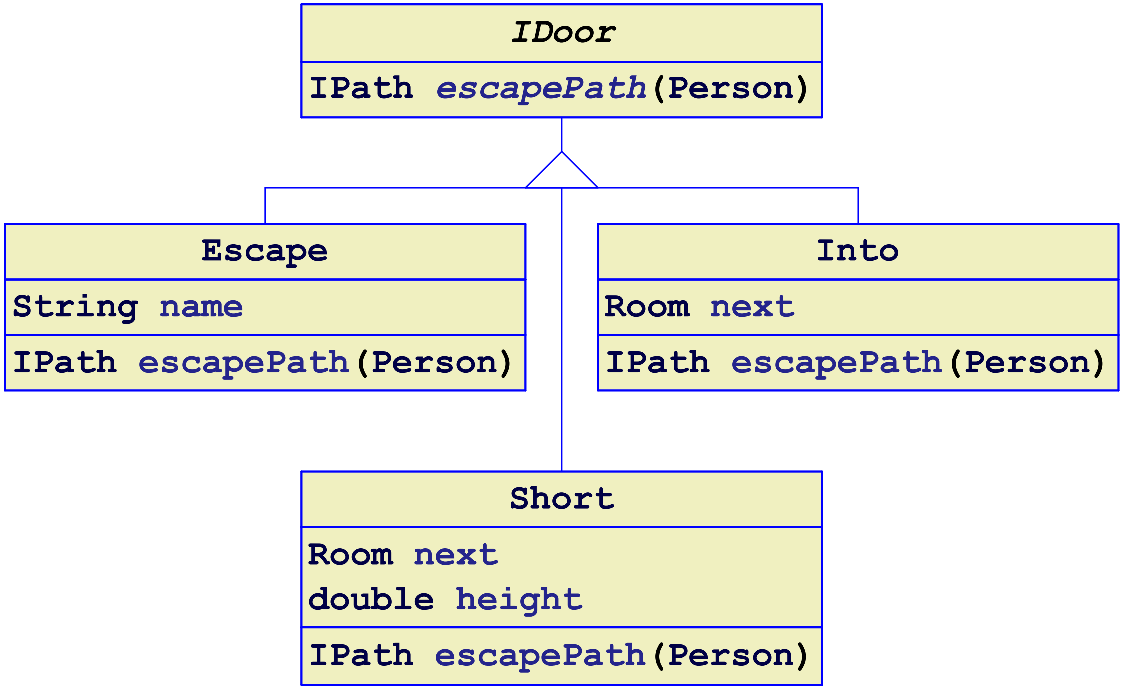
Into

Room next

IPath escapePath(Person)

Short Doors

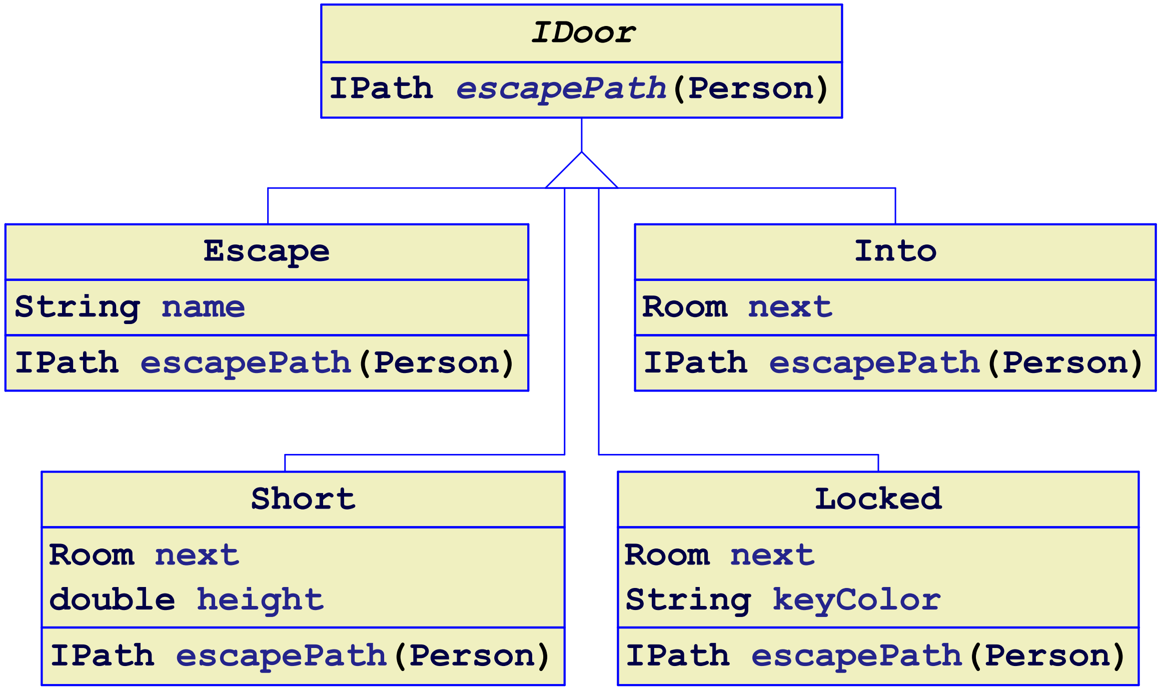
Add a new kind of door, a short door, where a person must be less that the door’s height to pass



Adding a short door requires only the declaration of a `Short` class — no other code changes!

Locked Doors

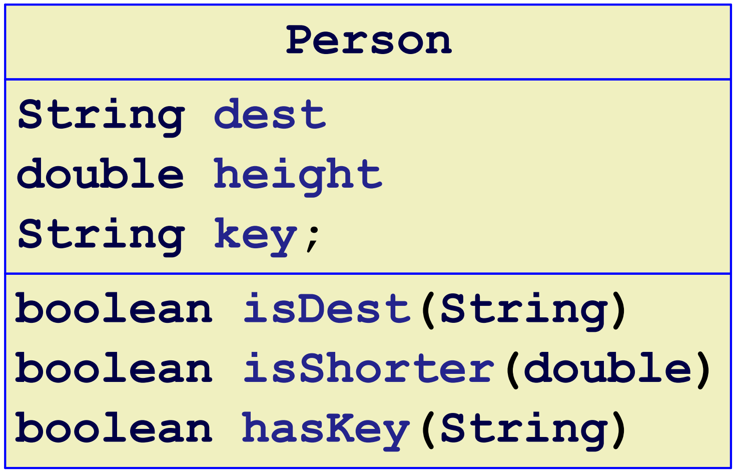
Add a new kind of door, a locked door, where a person must have a key to pass



A **`Person`** now needs keys...

Locked Doors

Besides adding **Locked**, we change **Person** to add the notion of keys to the person



```
Person
String dest
double height
String key;
boolean isDest(String)
boolean isShorter(double)
boolean hasKey(String)
```

In contrast to adding new variants, adding new operations requires changing the class

Racket versus Java

Racket:

- ○ New variant ⇒ change old functions
- ○ New function ⇒ no changes to old code

Java:

- ○ New variant ⇒ no changes to old code
- ○ New method ⇒ change old classes

This is the essential difference between ***functional*** programming and ***object-oriented*** programming