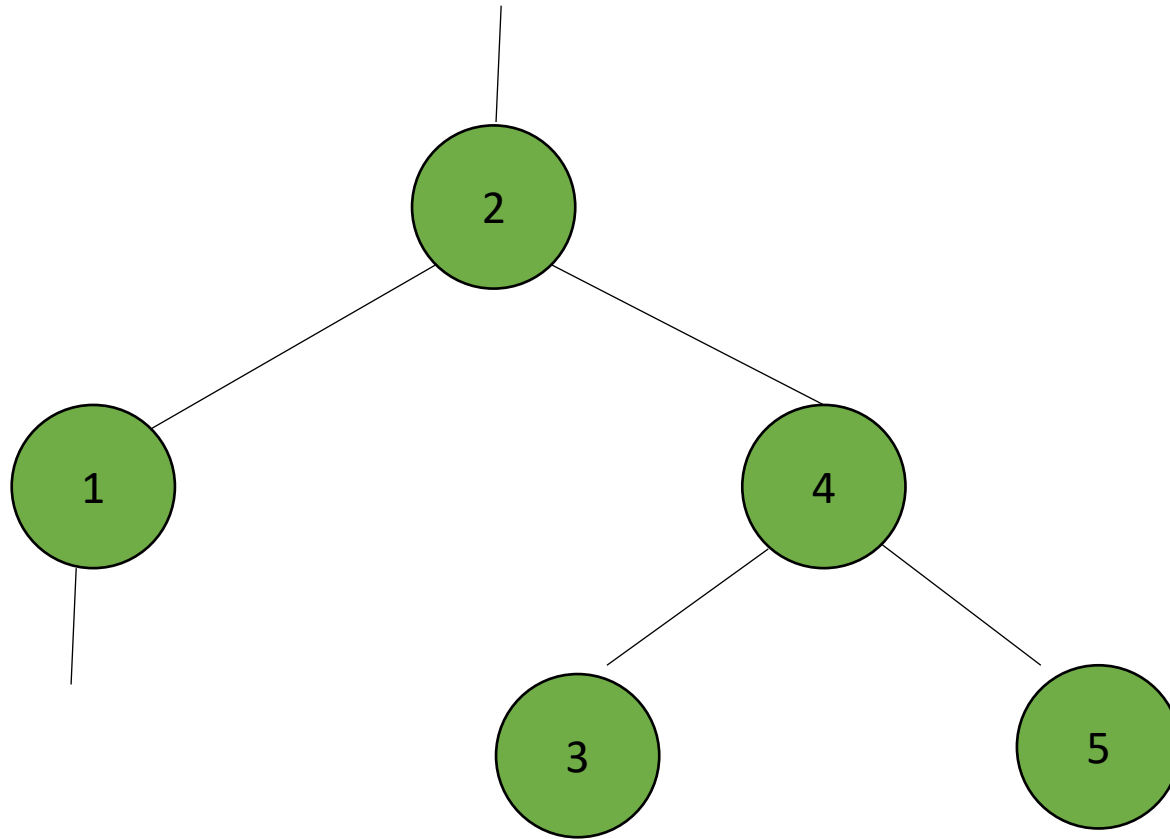# QUIZ-08-TYPE-AND-IR-GEN

Quiz

We can infer the type of an expression using in-order traversal on the AST

○ True

○ False

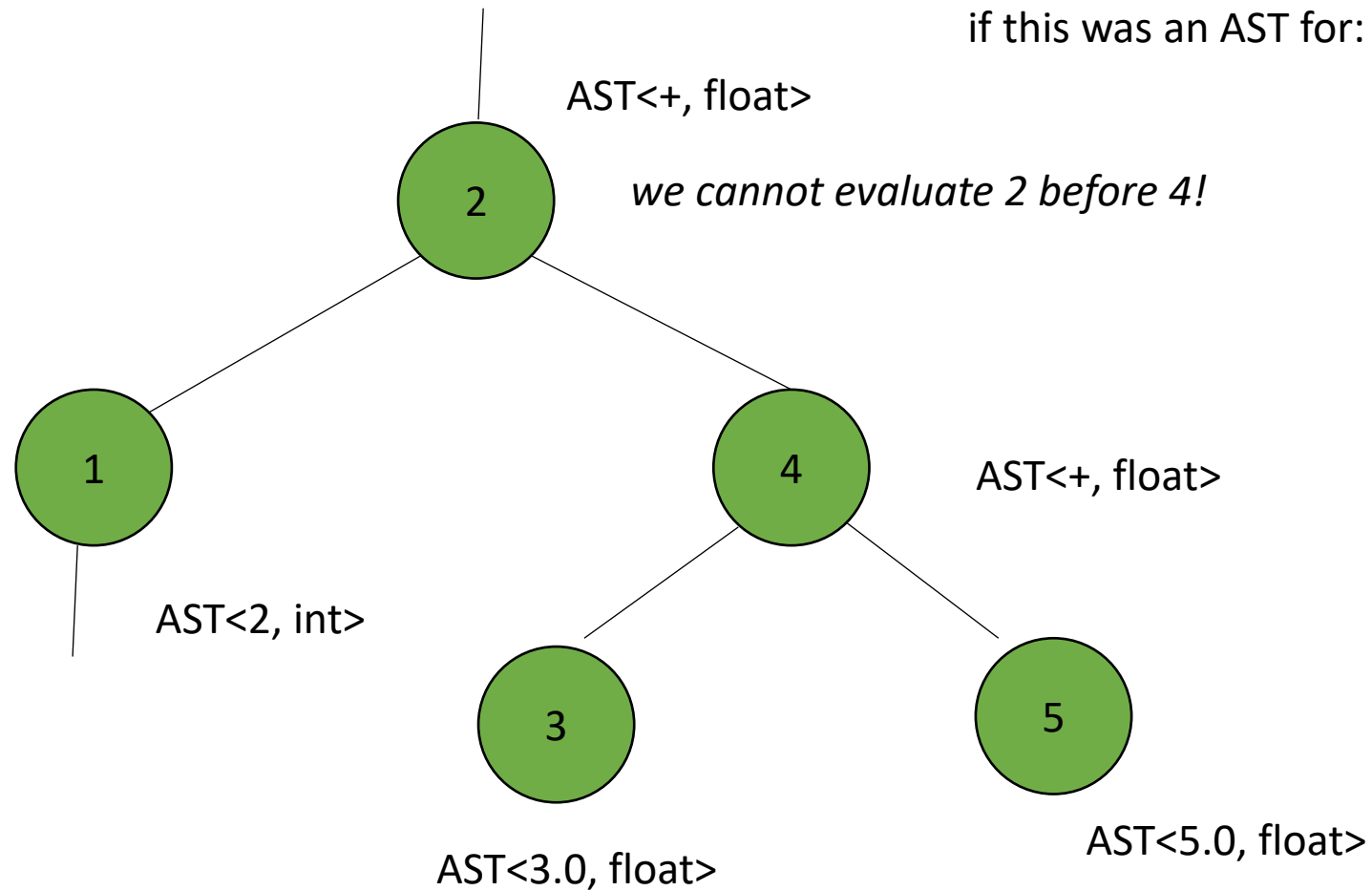# Discussion

What is the in order traversal order?

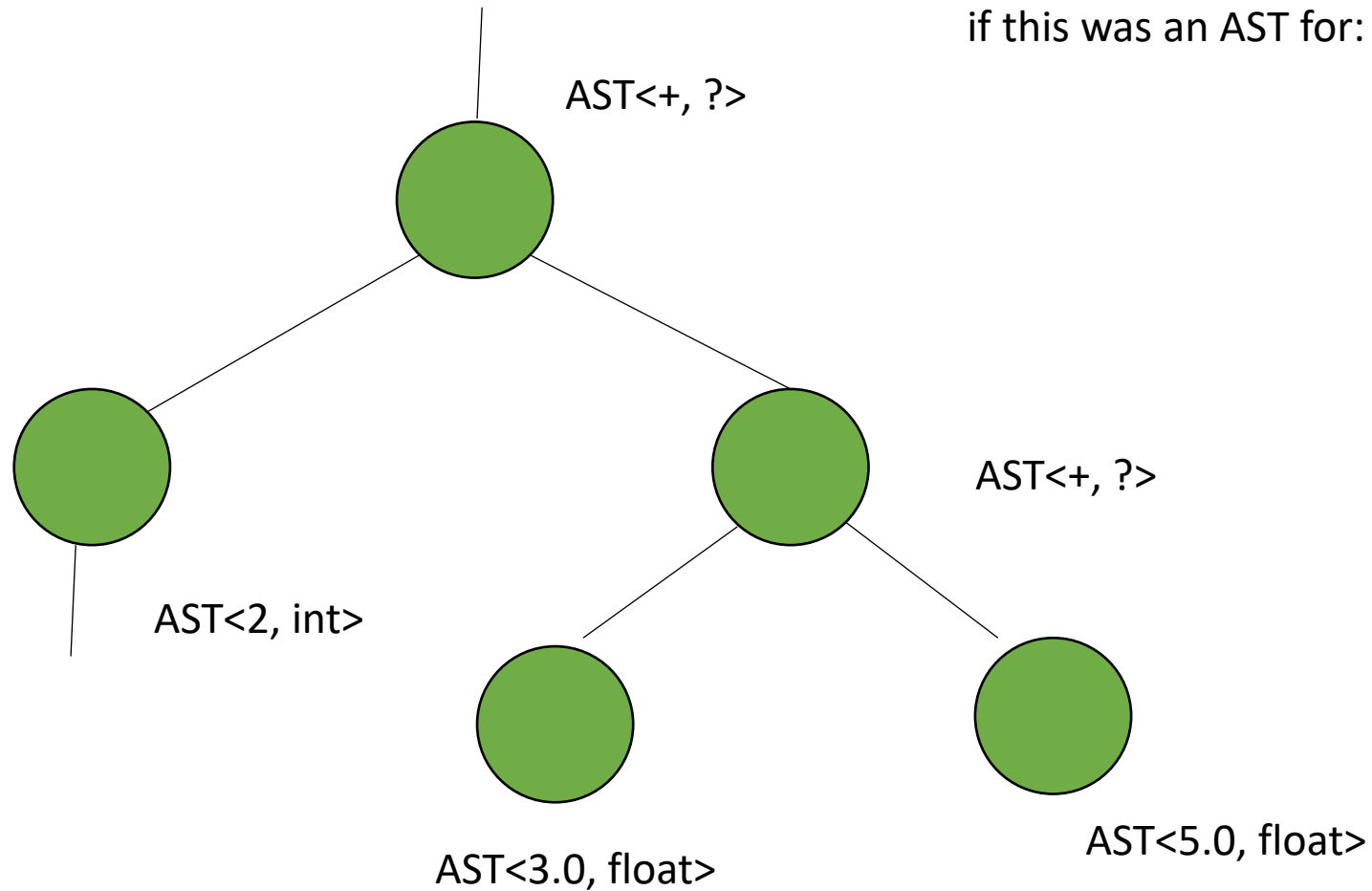# Discussion

What is the in order traversal order?

if this was an AST for: "2 + (3.0 + 5.0)"

AST<+, float>

we cannot evaluate 2 before 4!

AST<+, float>

AST<2, int>

AST<3.0, float>

AST<5.0, float>

Discussion

What is the post order traversal order?

if this was an AST for: "2 + (3.0 + 5.0)"

AST<+, ?>

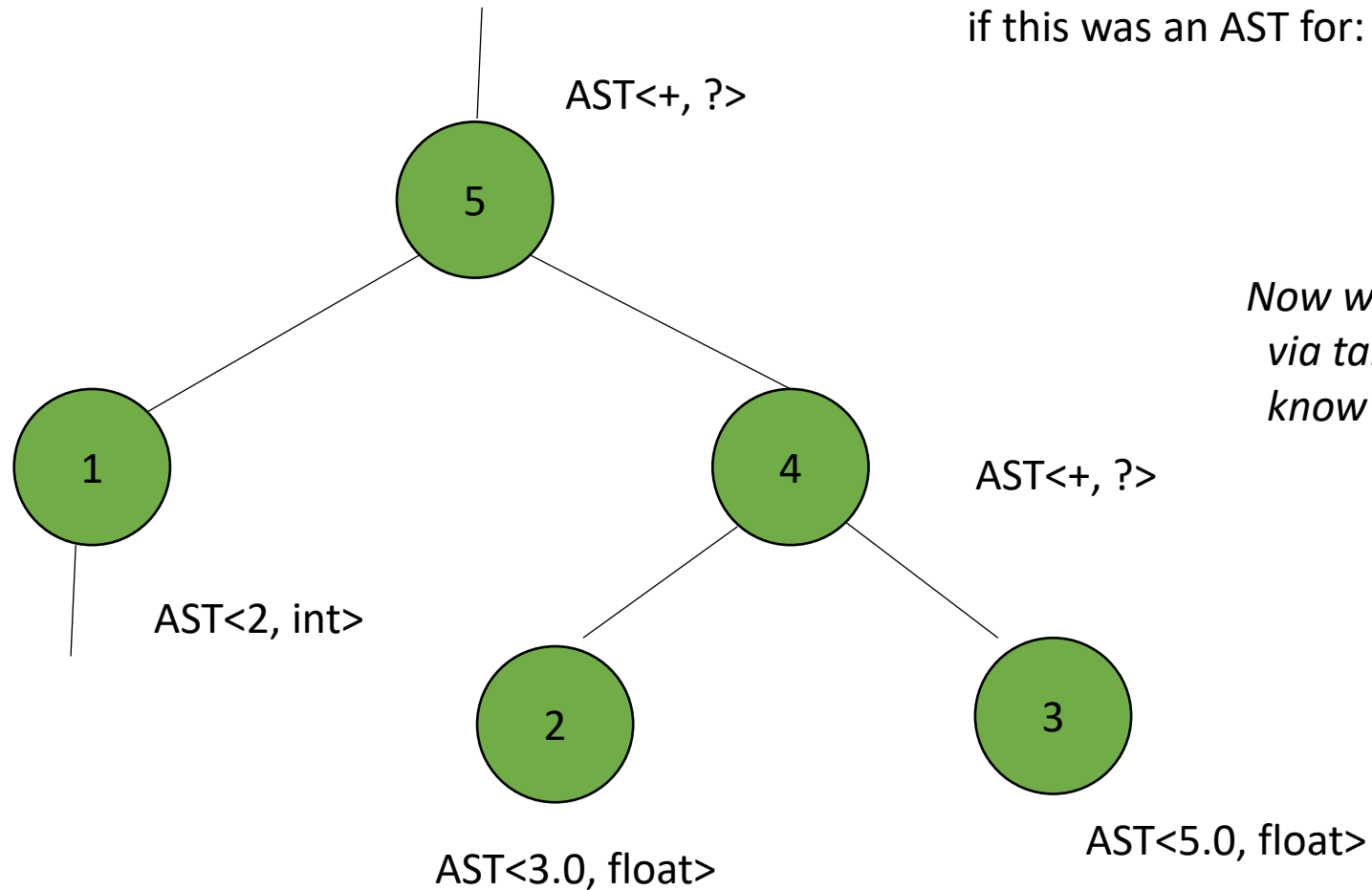AST<+, ?>

AST<2, int>

AST<3.0, float>

AST<5.0, float>

Discussion

What is the post order traversal order?

if this was an AST for: "2 + (3.0 + 5.0)"

Now we can do type inference via table lookup given that we know the type of the children.

AST<+, ?>

5

1

4   AST<+, ?>

AST<2, int>

2

3

AST<3.0, float>

AST<5.0, float>

Discussion

if this was an AST for: "2 + (3.0 + 5.0)"
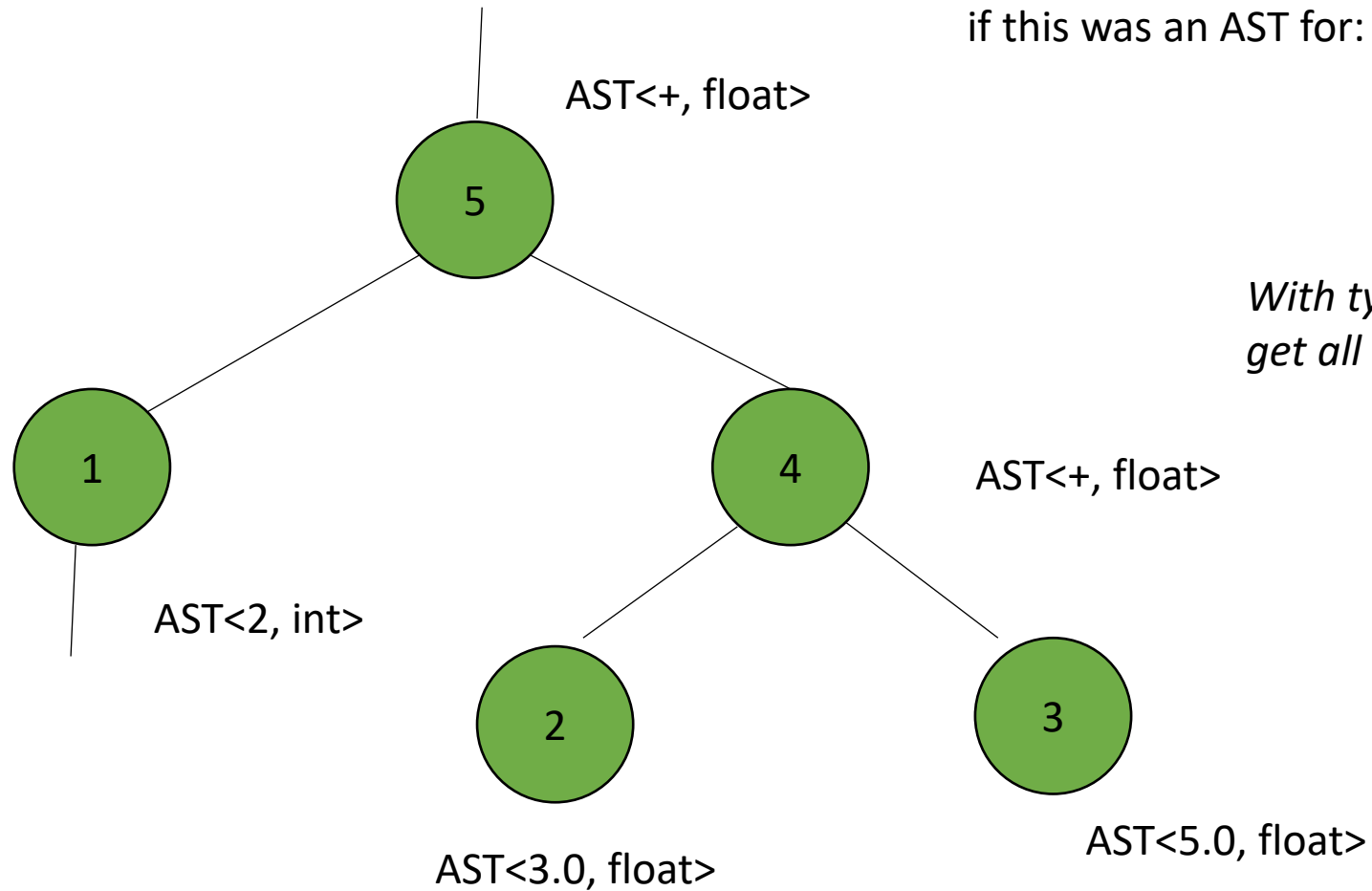
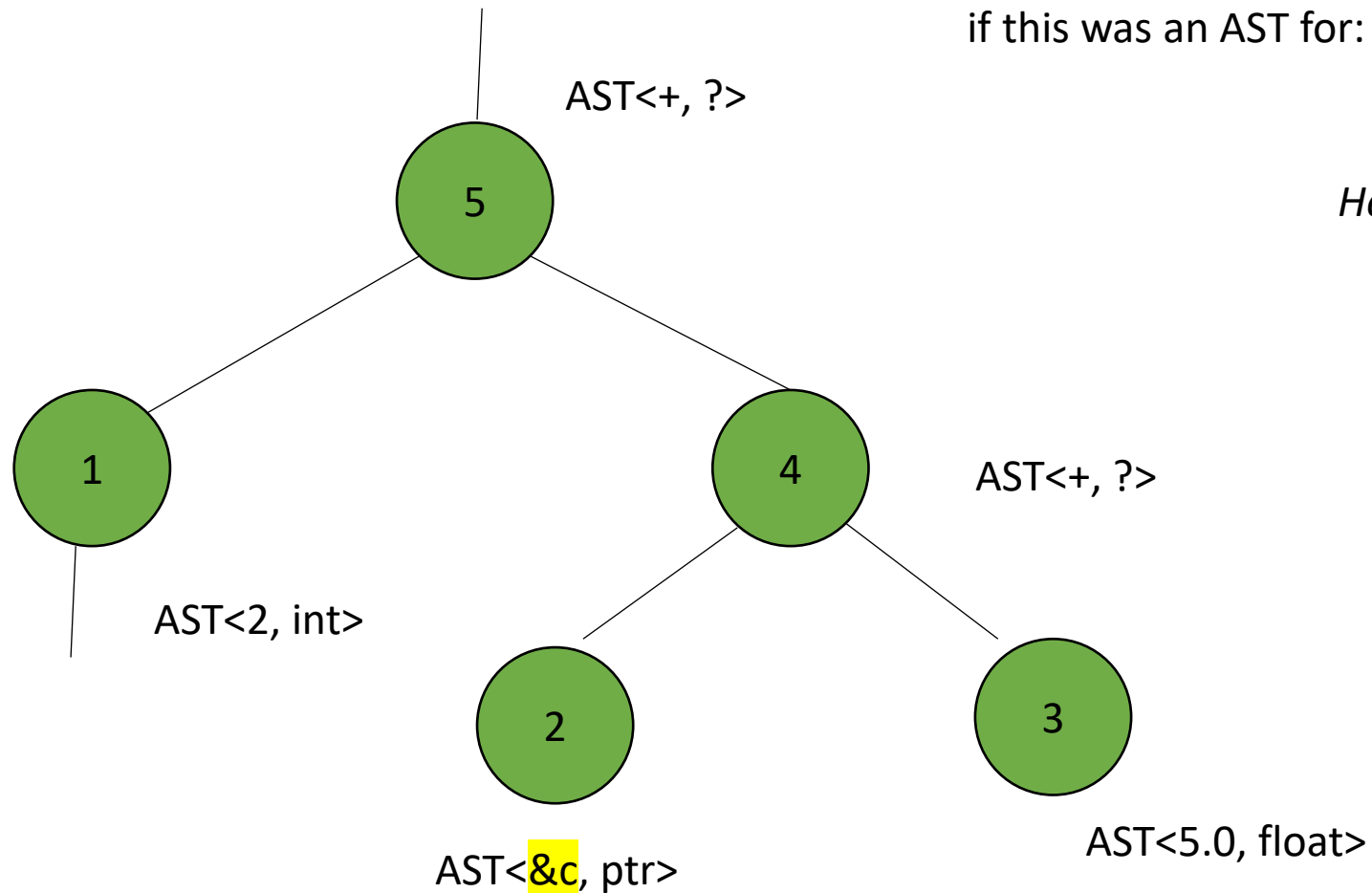*With type inference we can get all the types.*

AST<+, float>

5

1

AST<+, float>

4

AST<2, int>

2

3

AST<3.0, float>

AST<5.0, float>

Discussion

What is the post order traversal order?

if this was an AST for: "2 + (**&c** + 5.0)"

How does this change things?

AST<+, ?>

5

1

4   AST<+, ?>

AST<2, int>

2

3

AST<5.0, float>

AST<**&c**, ptr>

Quiz

Why do we use an AST as an IR? Why not directly go to a linear IR (or 3 address code)? Write a few sentences about this design choice.

Quiz

What are some ways that your favorite language lets you modify the type system? i.e., expand the type conversion tables.

Quiz

How many labels do you need for the following expression?

```
int x, y;

...

if (x==0){

...

} else if (y>1) {

...

}else {

...

}
```

○ 0

○ 1

○ 2

○ 3

Quiz

The number of virtual registers is equal to the number of nodes in the AST

○ True

○ False

Quiz

Discuss an optimization or two that you could imagine doing as you convert an AST into 3 address code