CSE 333 AA
Section 02

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Structures in C

Defining a struct:

```
struct orchard_st {
   char name[20];
};
```

Using a struct:

```
struct orchard_st my_orchard;
```

Does this work?

```
orchard_st my_orchard;
```

In memory:

my_orchard:

name:

0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??

Structures in C

Defining a struct:

```
struct orchard_st {
   char name[20];
};
```

Using typedef to create type name aliases:

```
typedef struct orchard_st Orchard, *OrchardPtr;
```

Now:

```
Orchard x;
OrchardPtr y;
```

is equivalent to:

```
struct orchard_st x;
struct orchard_st *y;
```

Structures in C

Combining structure definition with typedef:

```
typedef struct orchard_st {
   char name[20];
} Orchard, *OrchardPtr;
```

Structures are passed by value

```
void func(Orchard x) {
  x.name[0] = 'B';
}

int main(int argc, char *argv[]) {
  Orchard my_orchard;
  strcpy(my_orchard.name, "A");
  func(my_orchard);
  return 0;
}
```

Stack frame of main:

my_orchard:

name:

0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??

Structures are passed by value

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void func(Orchard x) {
   x.name[0] = 'B';
}

int main(int argc, char *argv[]) {
   Orchard my_orchard;
   strcpy(my_orchard.name, "A");
   func(my_orchard);
   return 0;
}
```

Stack frame of main:

my_orchard:

name:			
'A'	0x00	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??

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```

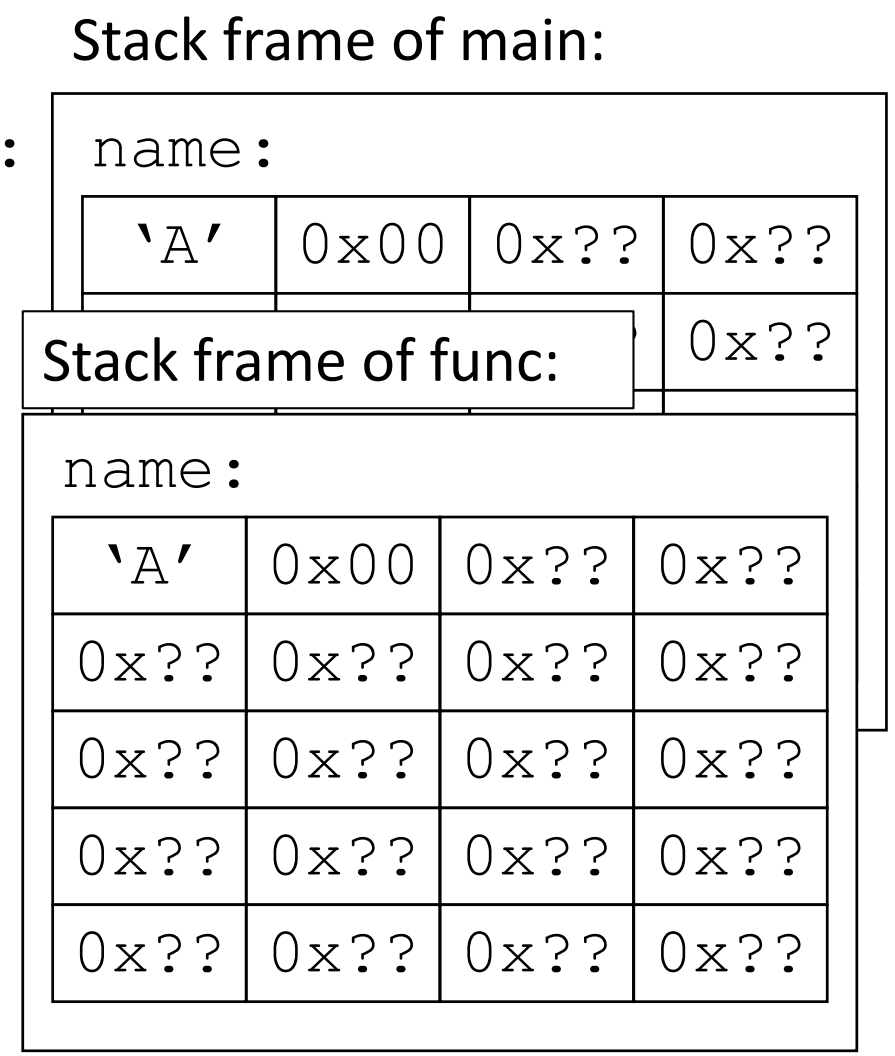

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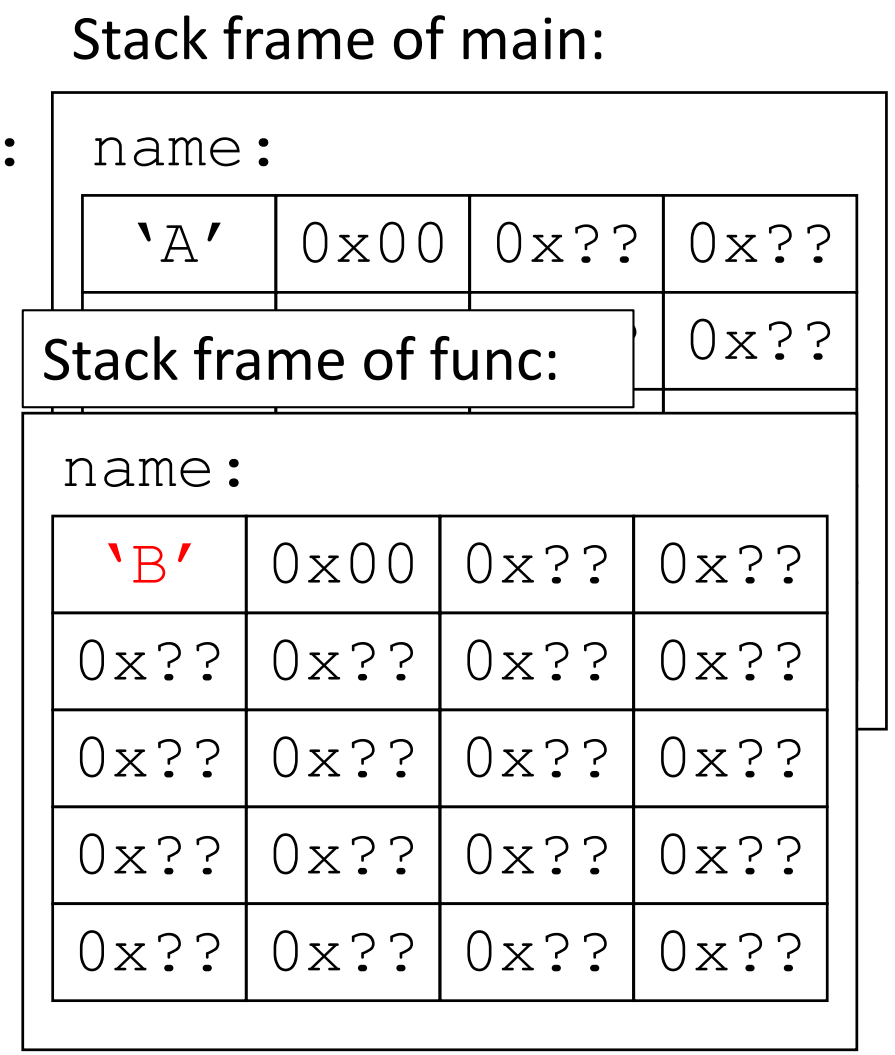

Structures are passed by value

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void func(Orchard x) {
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}

int main(int argc, char *argv[]) {
  Orchard my_orchard;
  strcpy(my_orchard.name, "A");
  func(my_orchard);
  return 0;
}
```

Stack frame of main:

my_orchard:

name:

'A'	0x00	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??
0x??	0x??	0x??	0x??

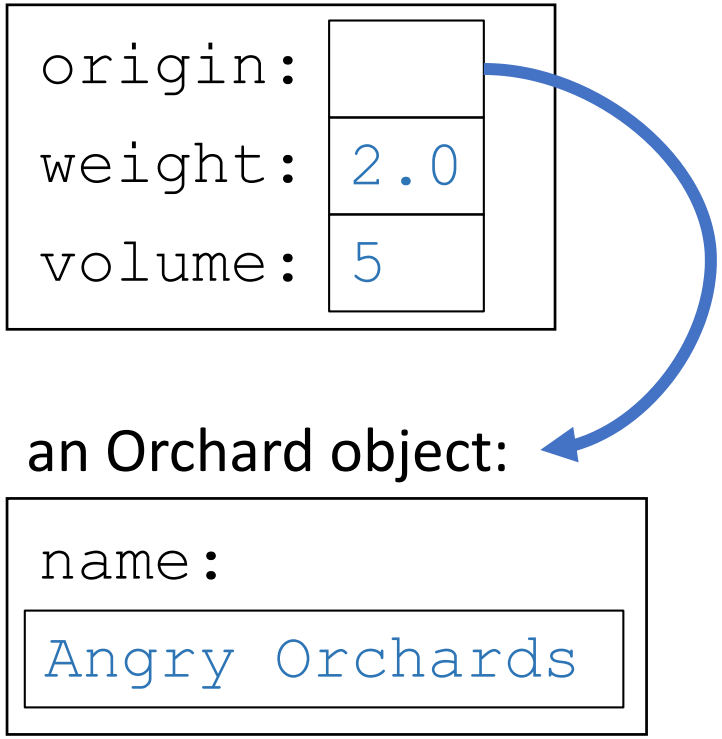
Worksheet Problem 1

```
typedef struct orchard_st {
   char name[20];
} Orchard, *OrchardPtr;

typedef struct fruit_st {
   OrchardPtr origin;
   double weight;
   int volume;
} Fruit, *FruitPtr;
```

Example usage:

a Fruit object:



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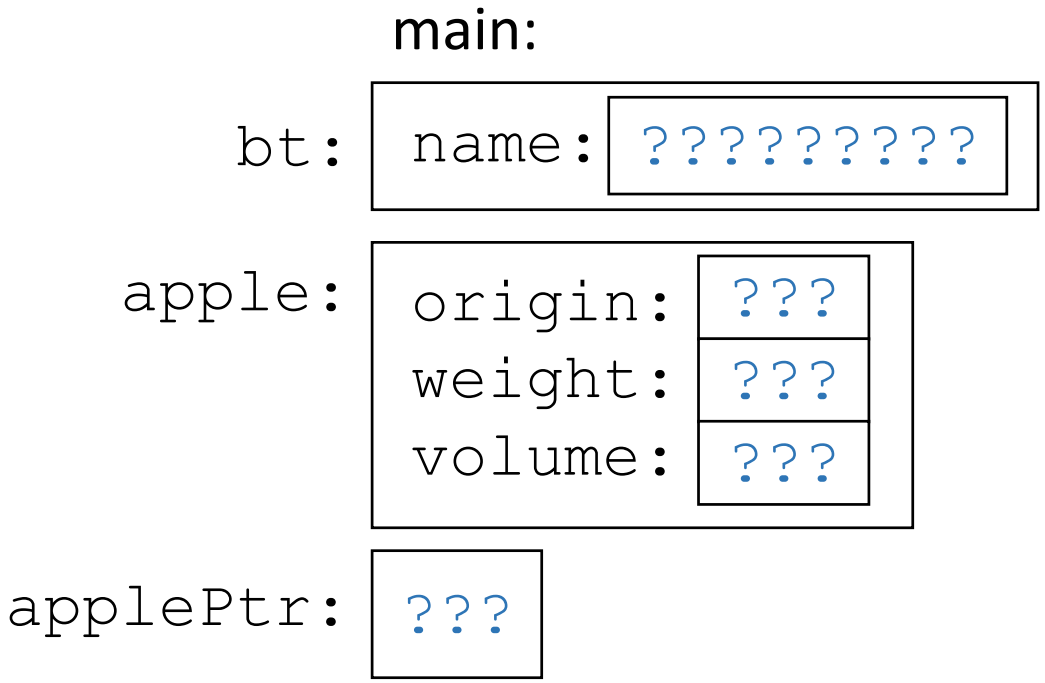

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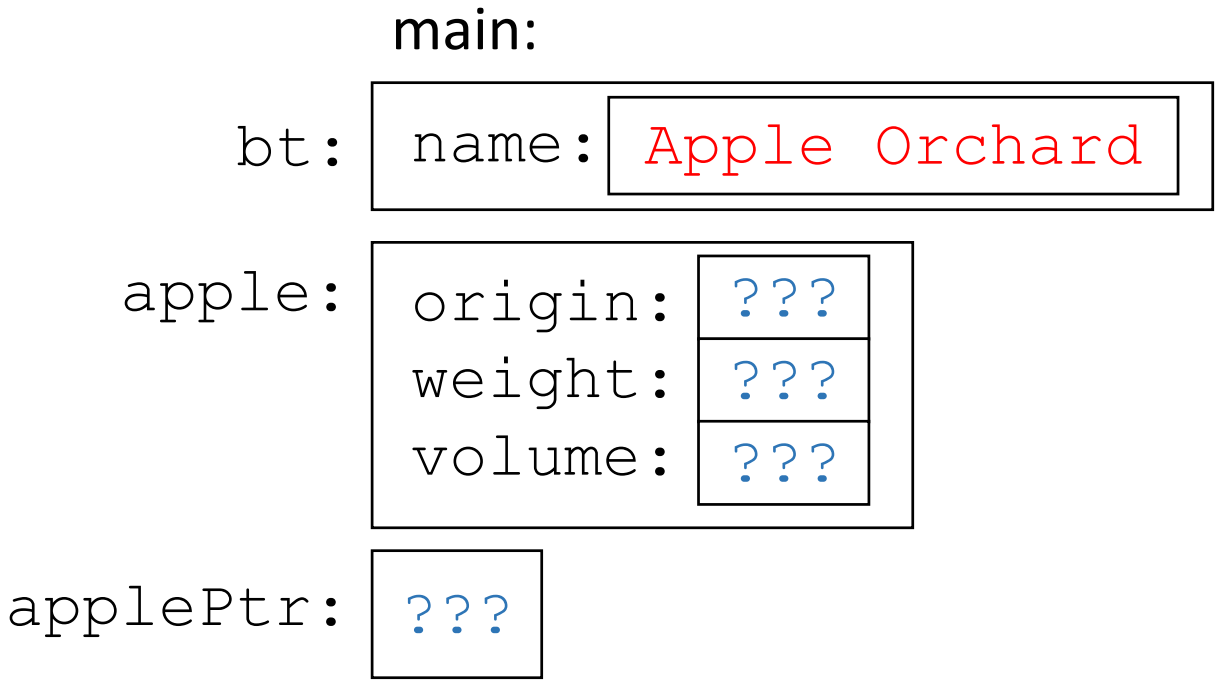

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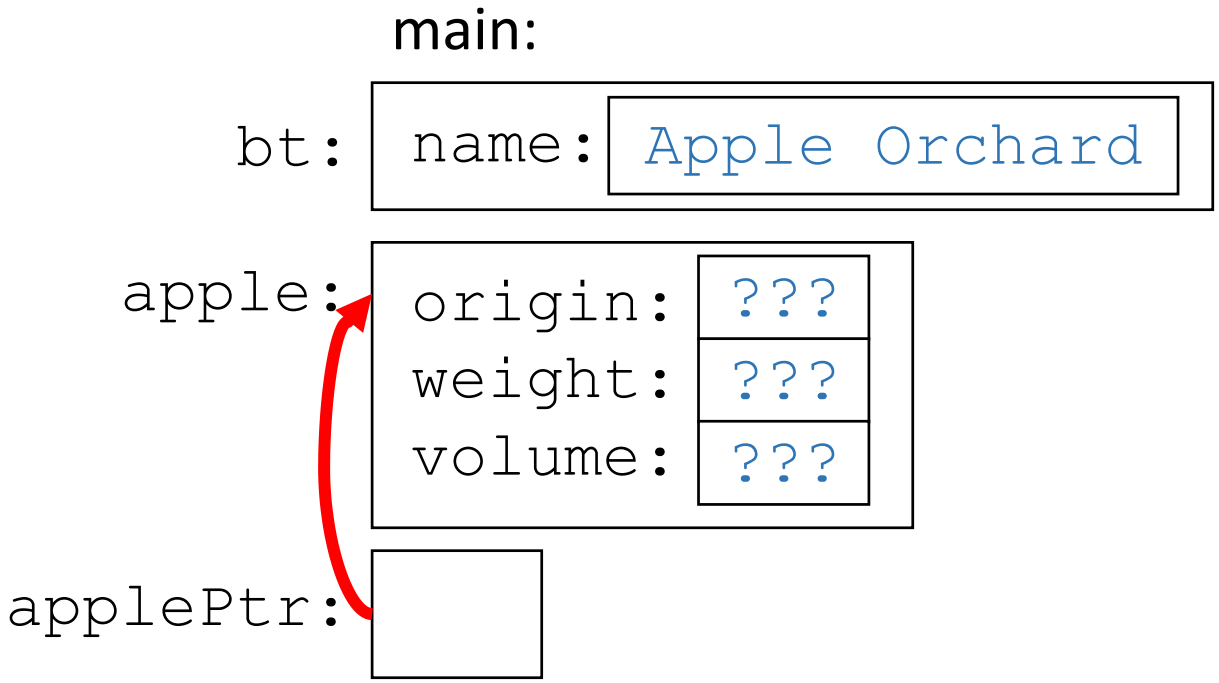

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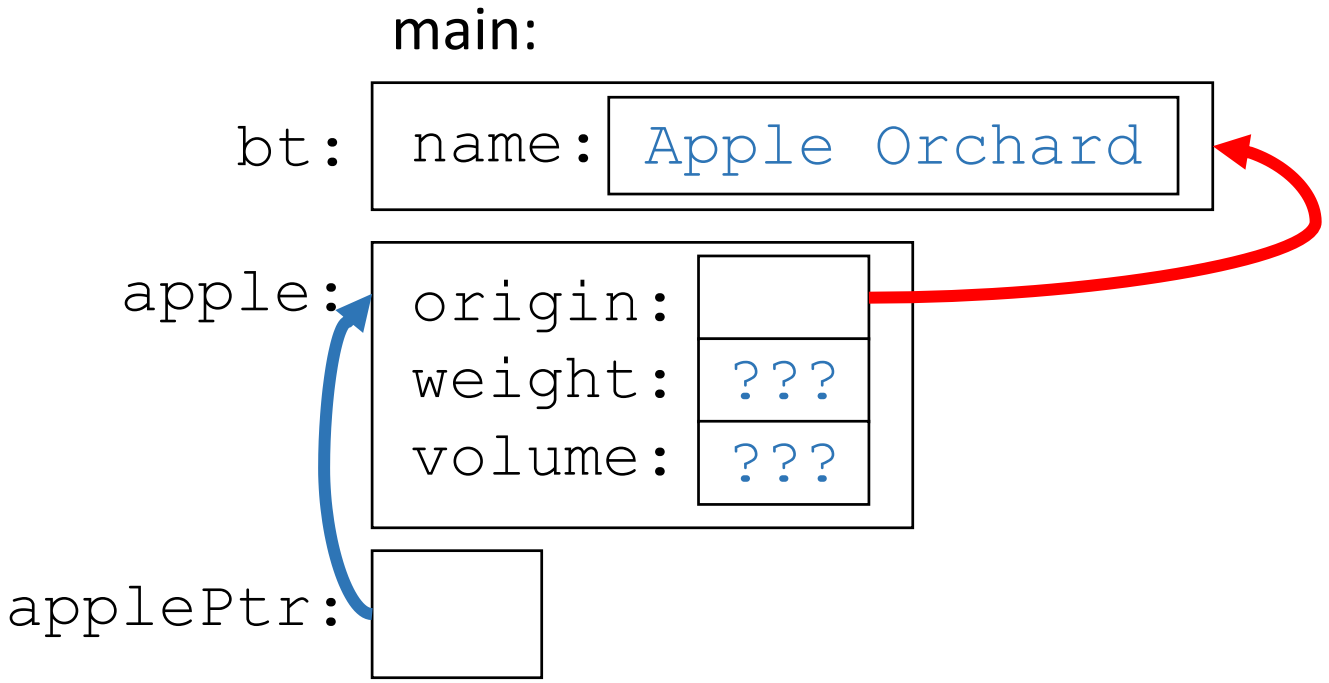

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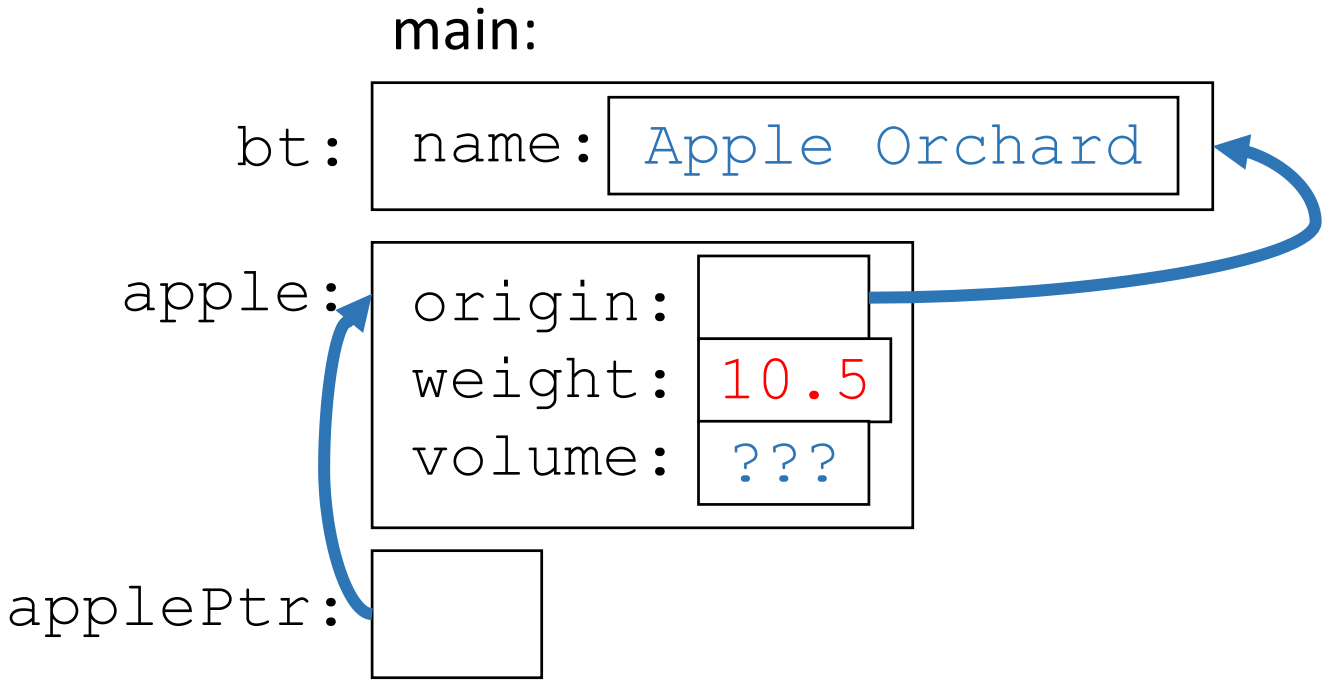

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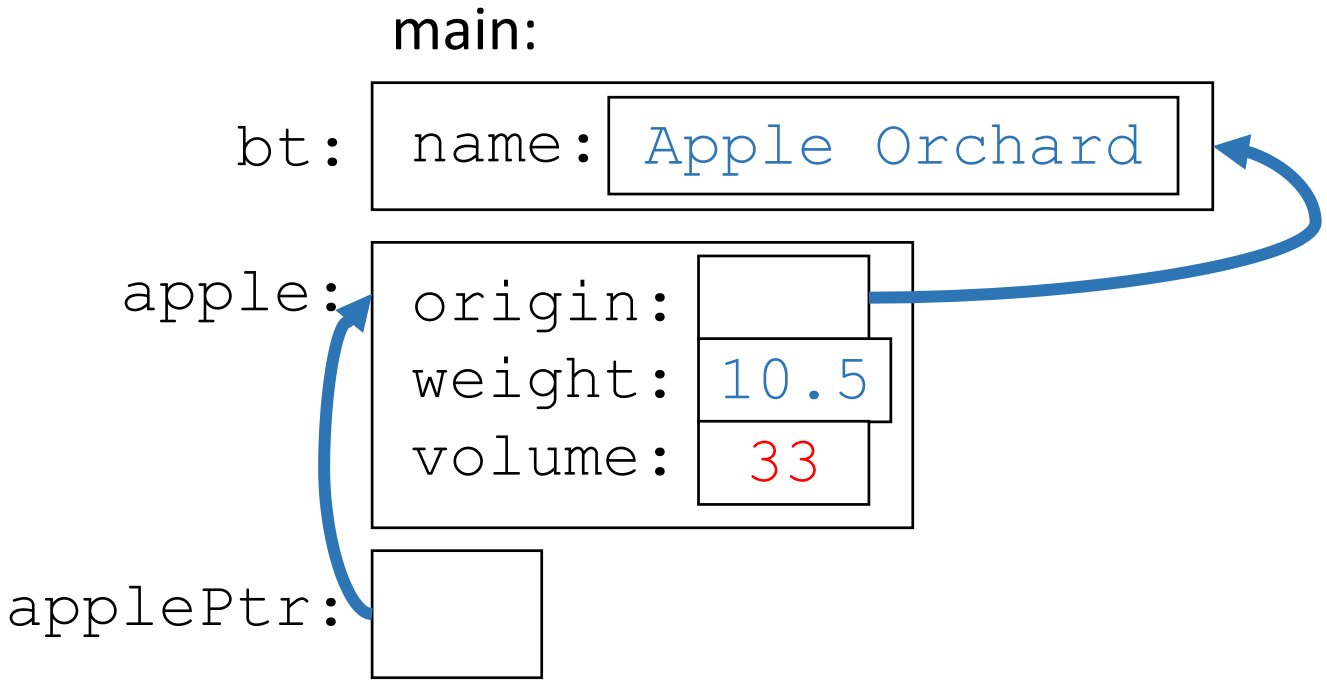

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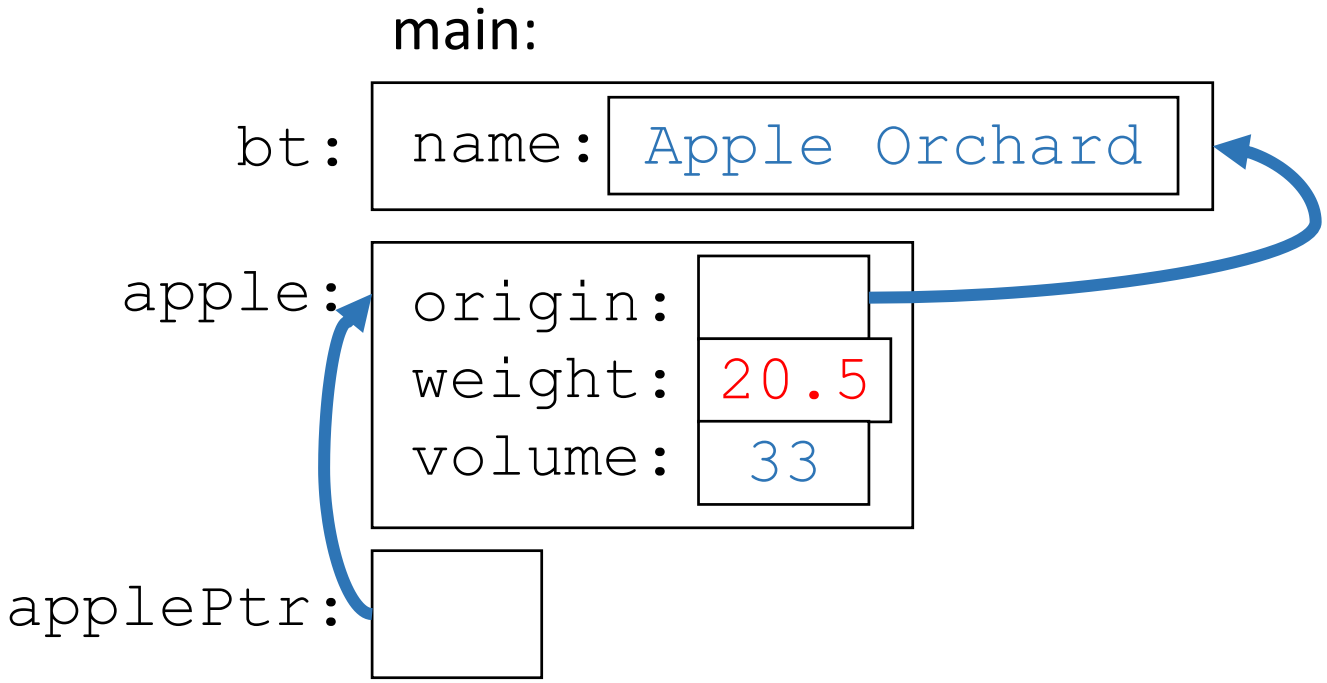
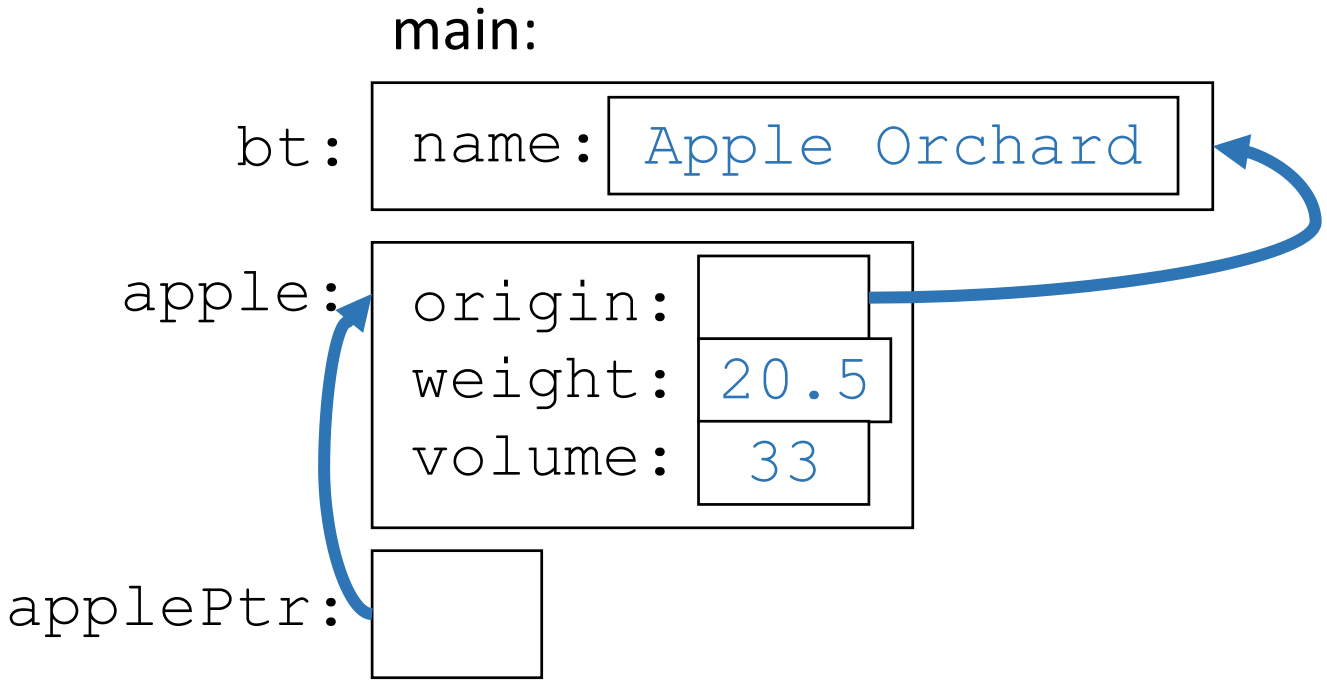


1. 20.5, 33, Apple Orchard

Worksheet Problem 1



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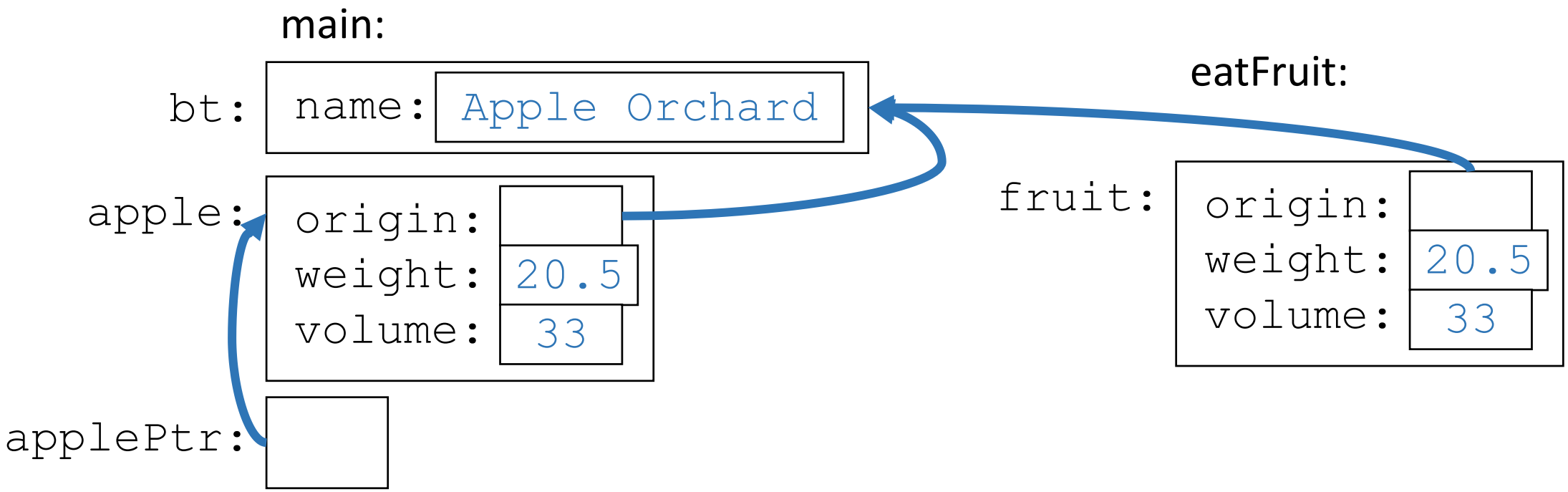

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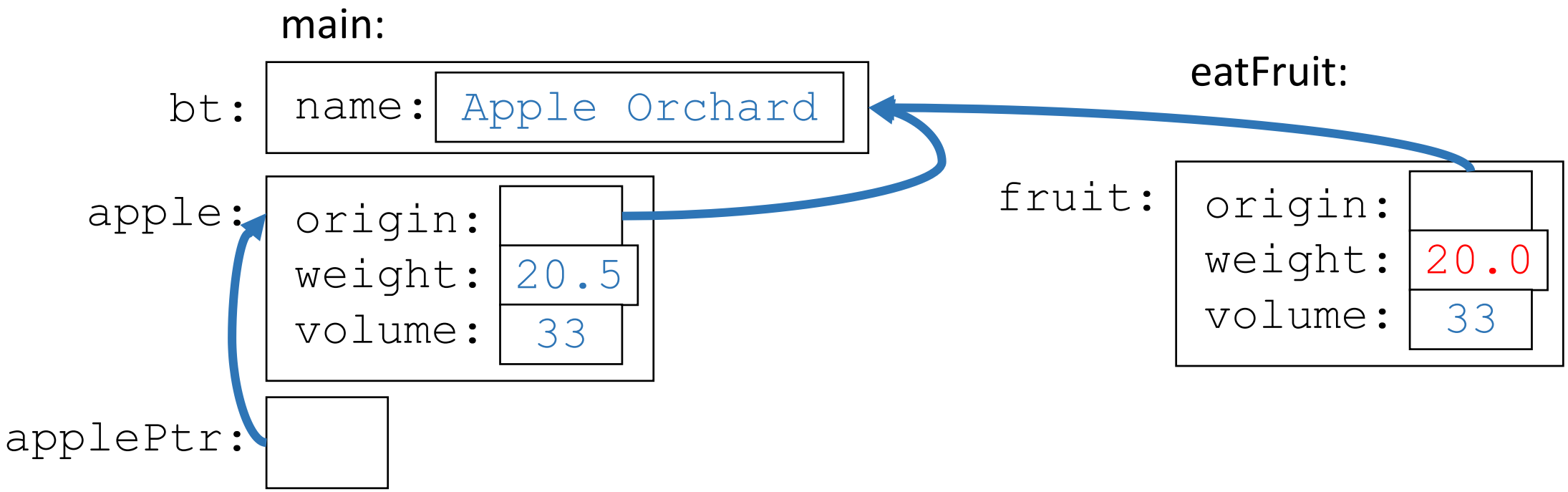

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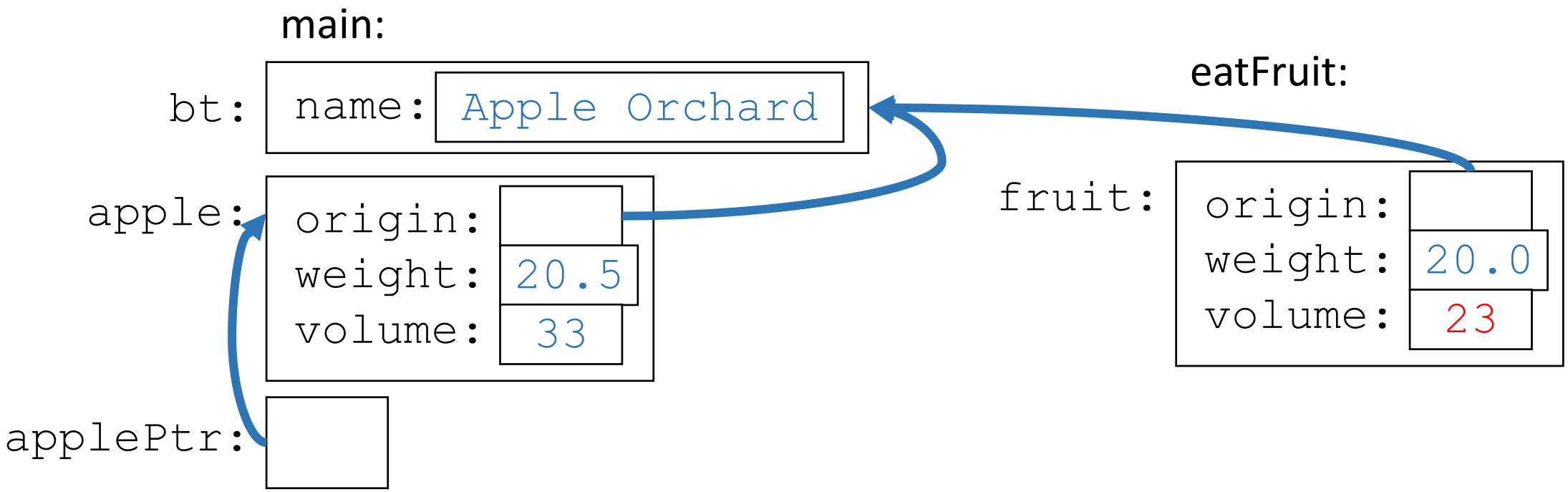

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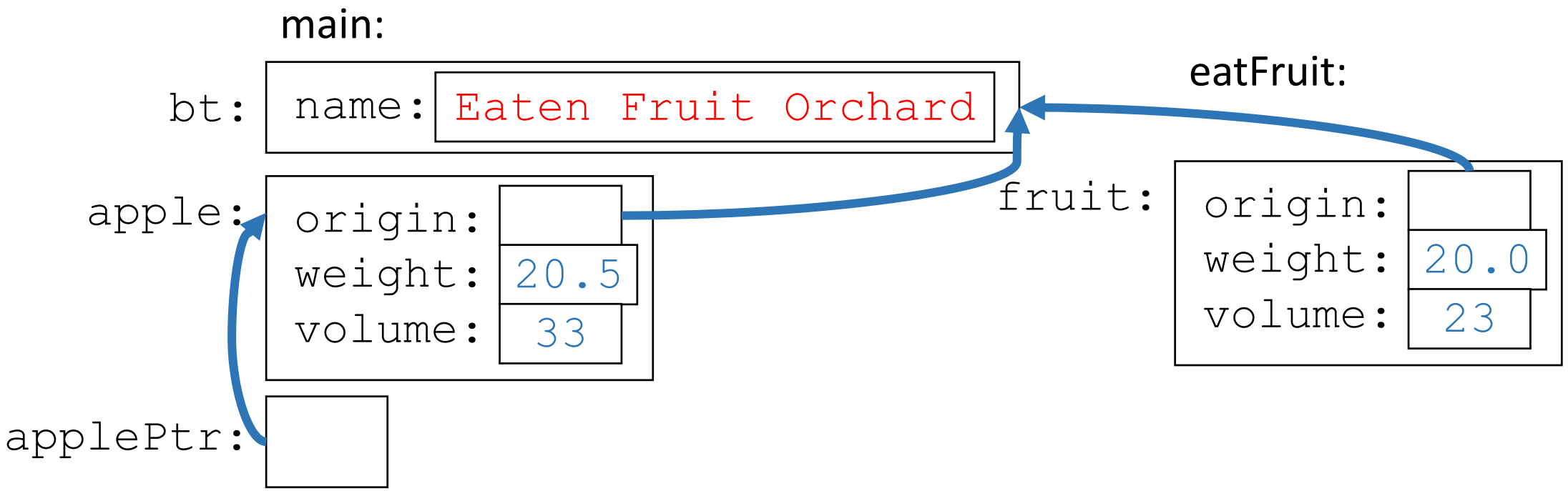

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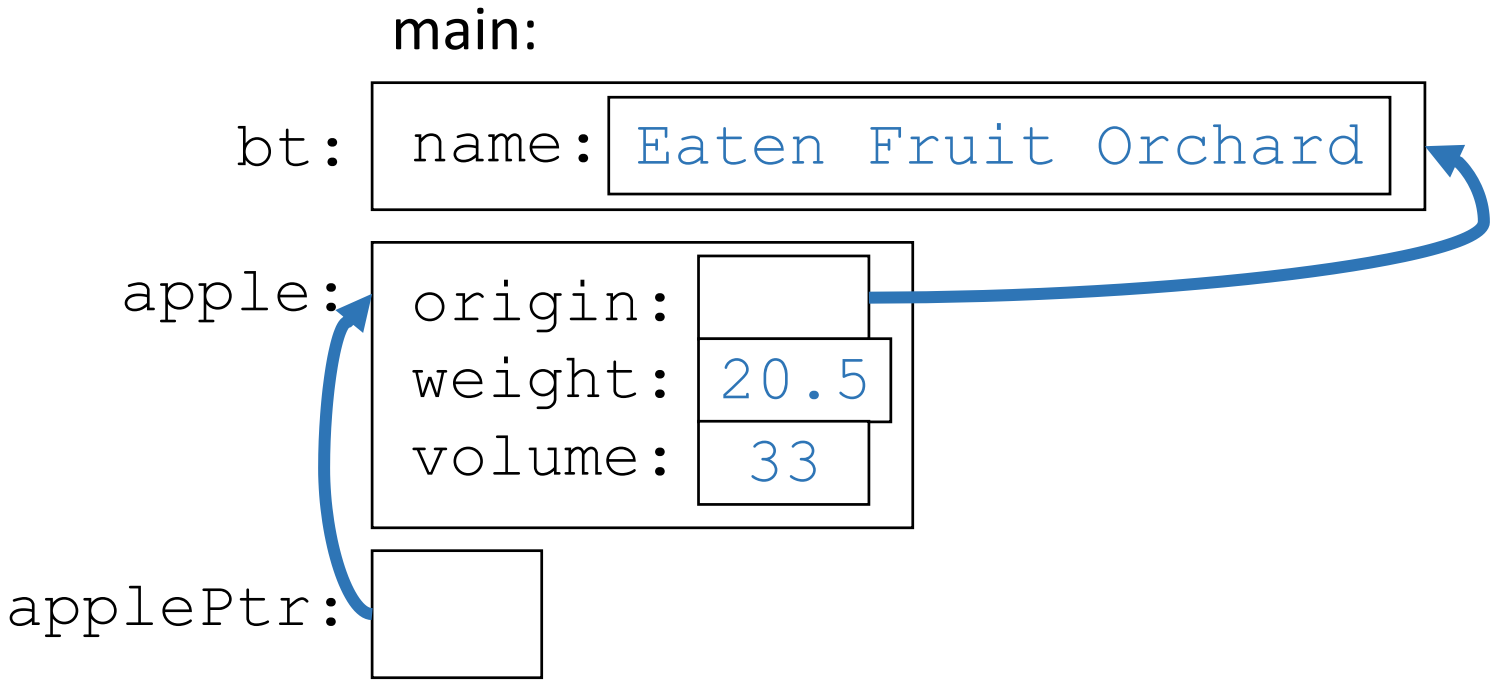

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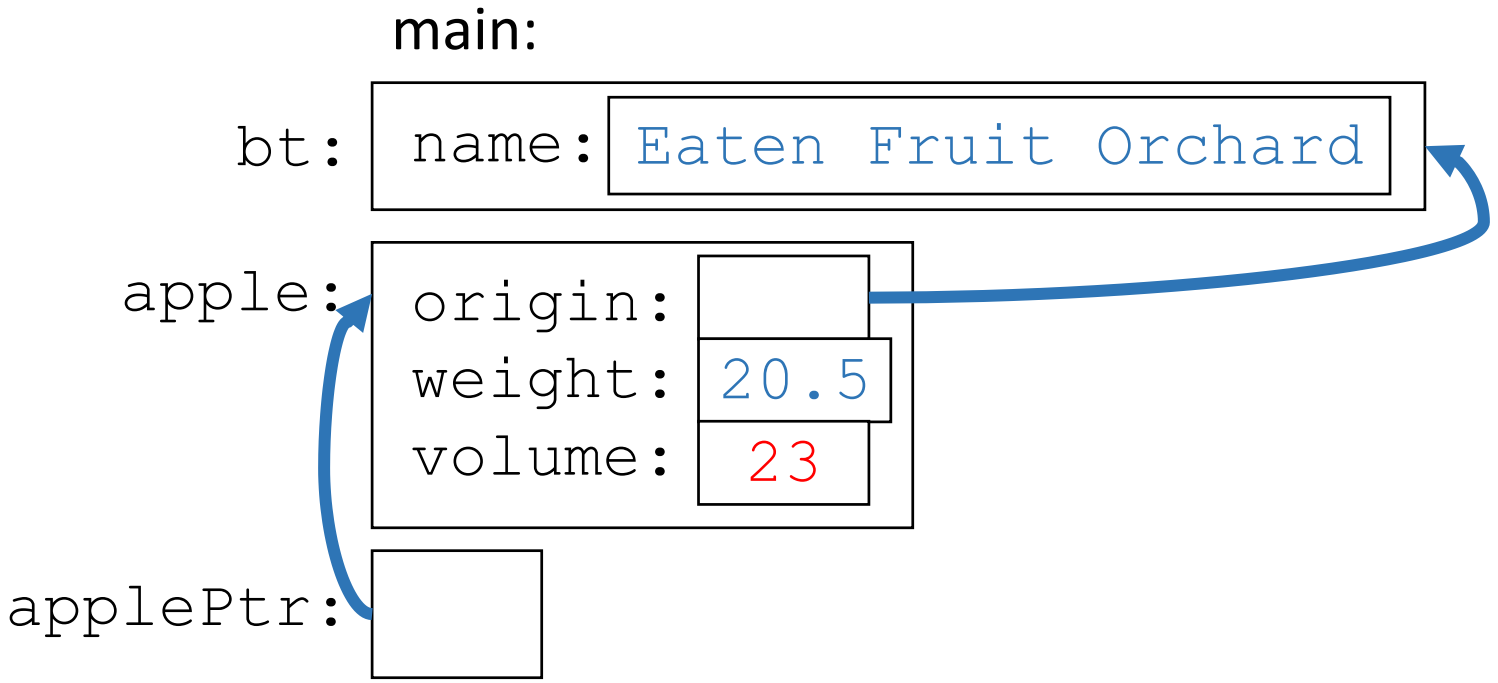
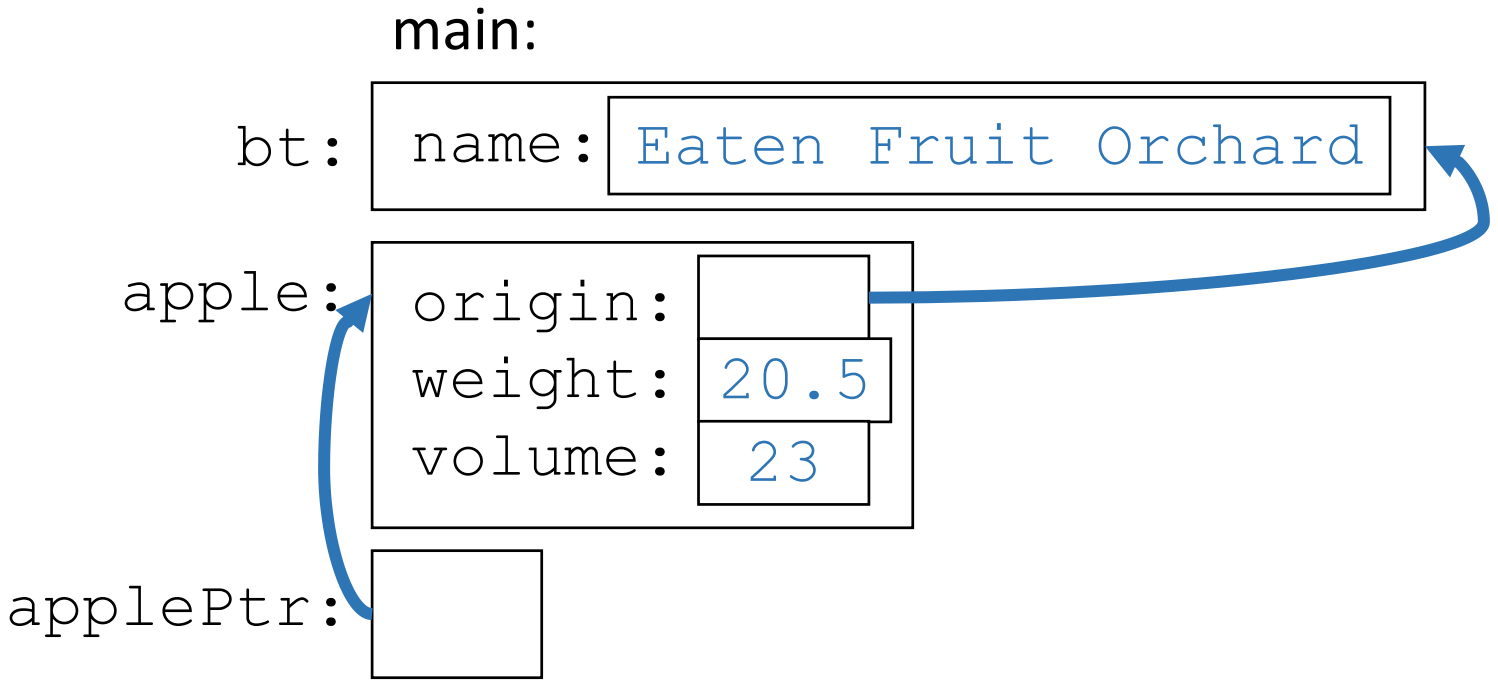


Worksheet Problem 1

1. 20.5, 33, Apple Orchard
2. 20.5, 23, Eaten Fruit Orchard



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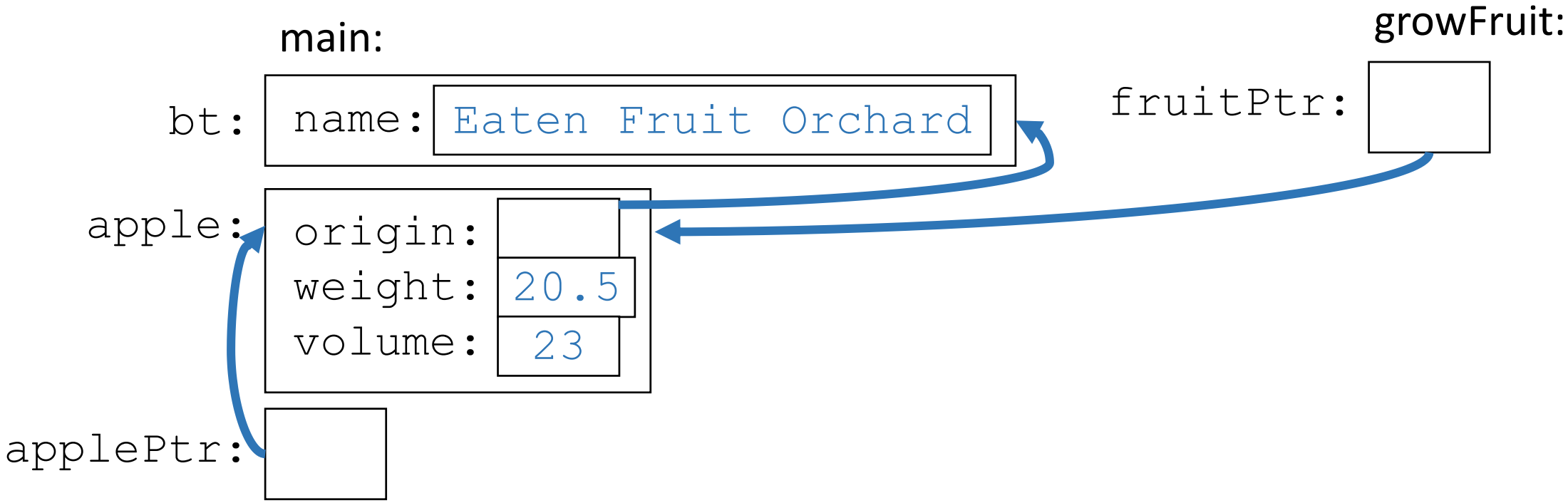

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```
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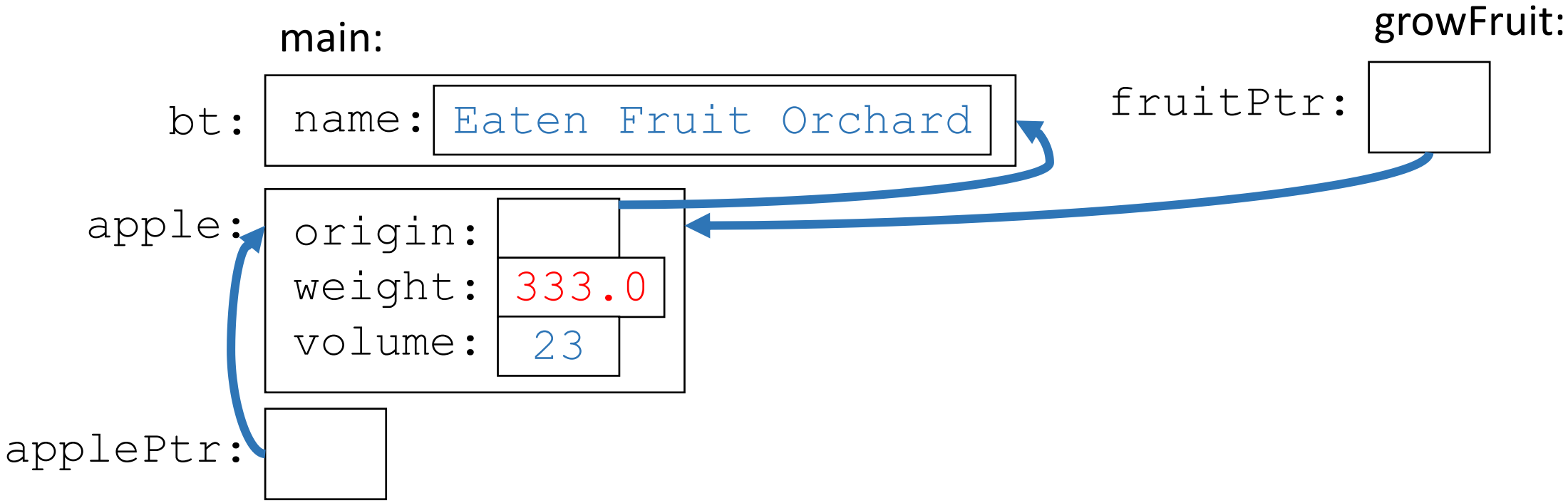

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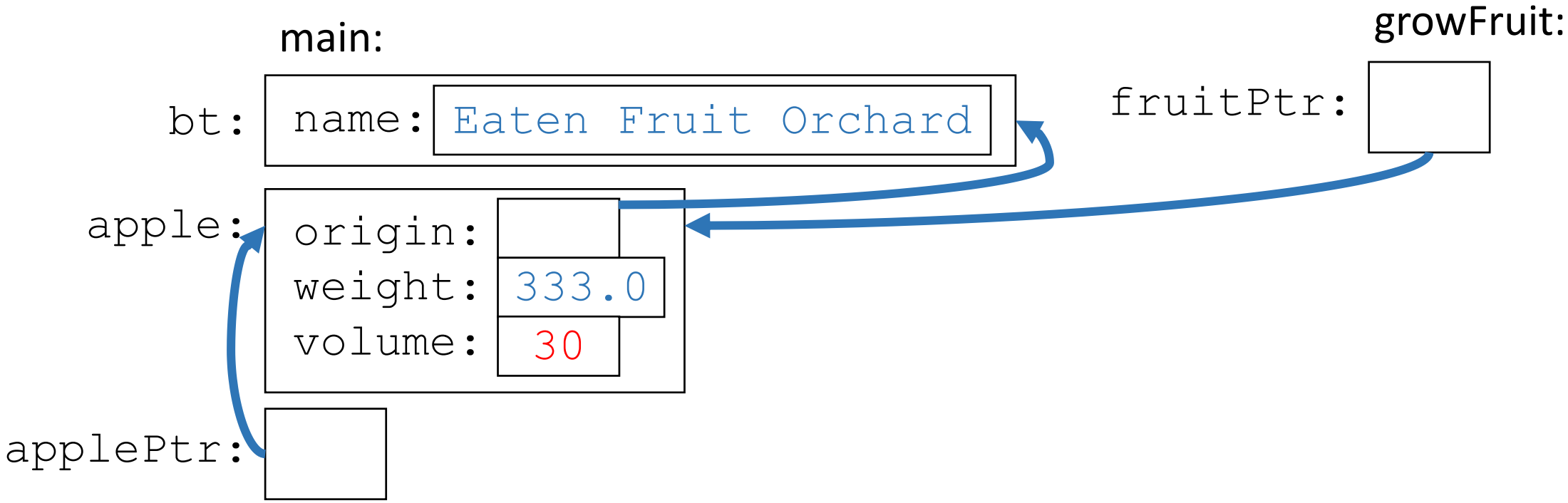

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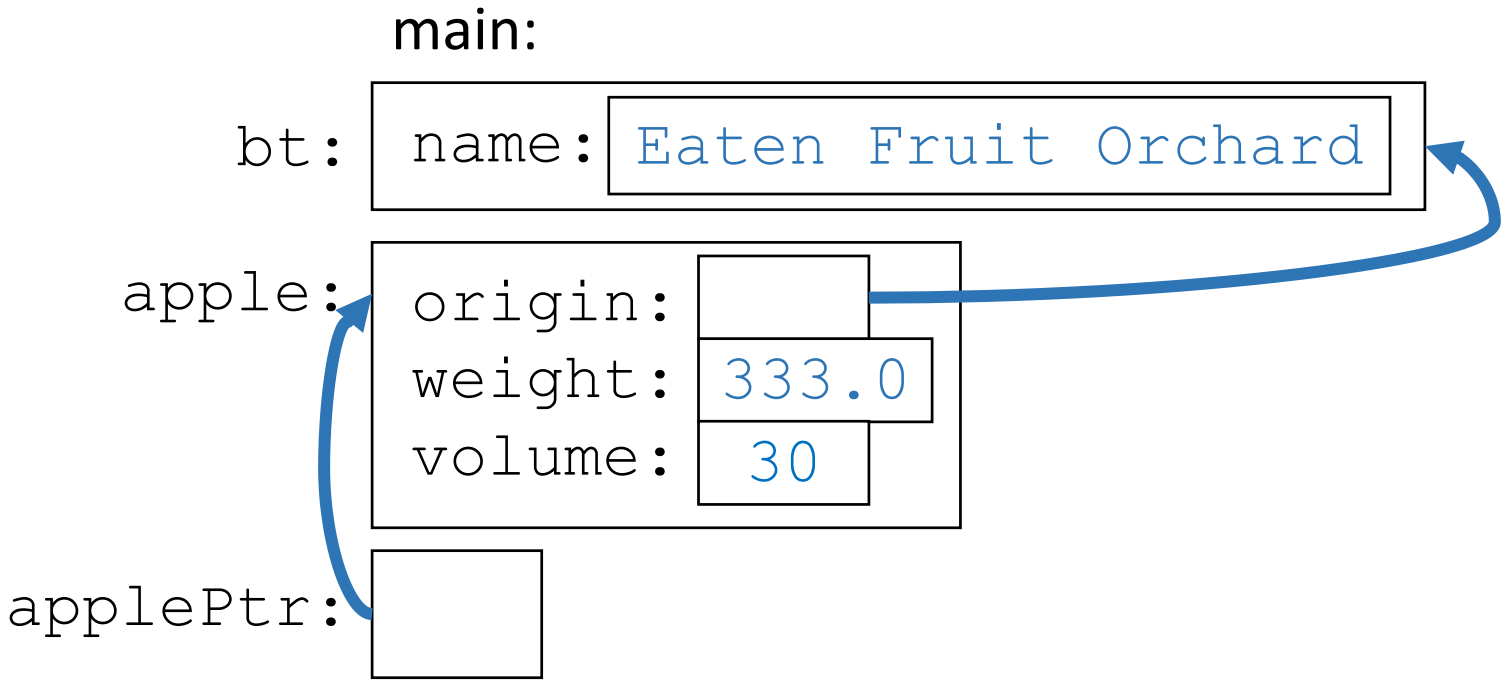
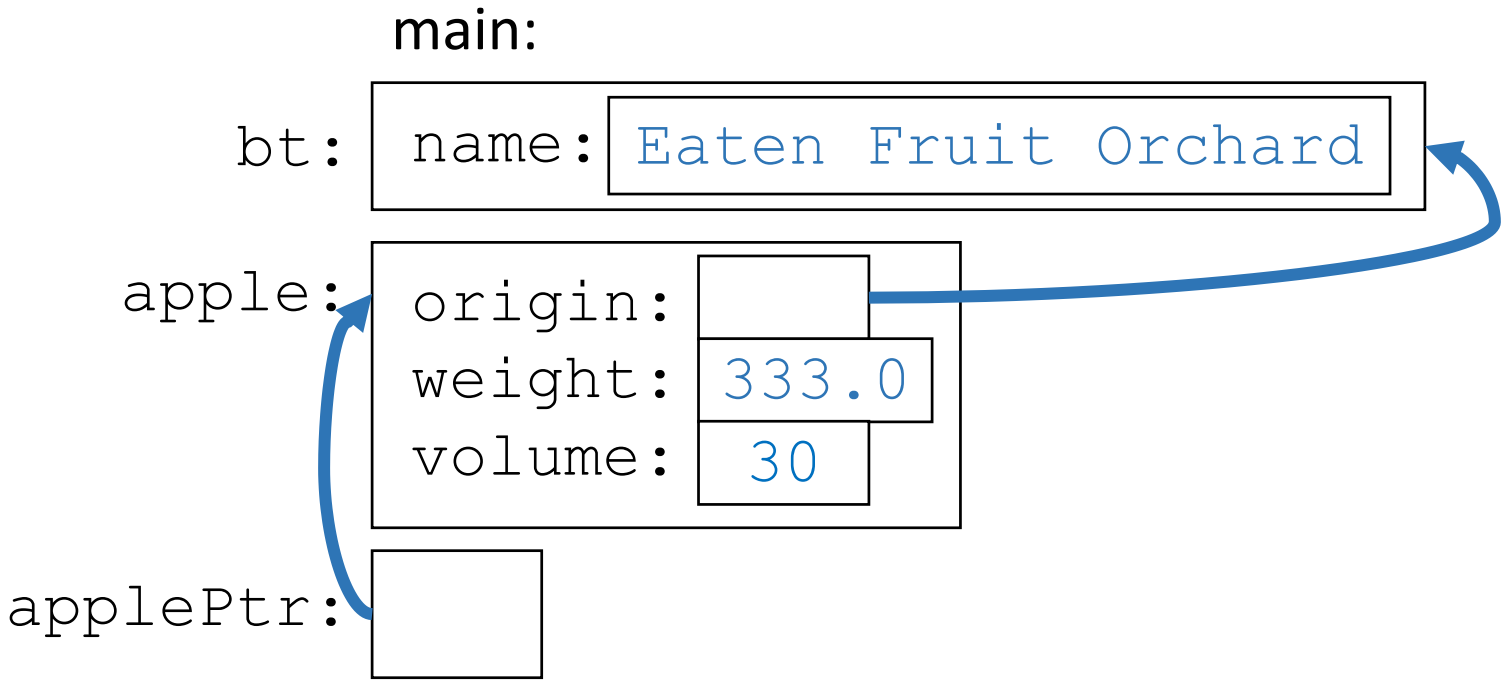


Worksheet Problem 1

1. 20.5, 33, Apple Orchard
2. 20.5, 23, Eaten Fruit Orchard
3. 333.0, 30, Eaten Fruit Orchard



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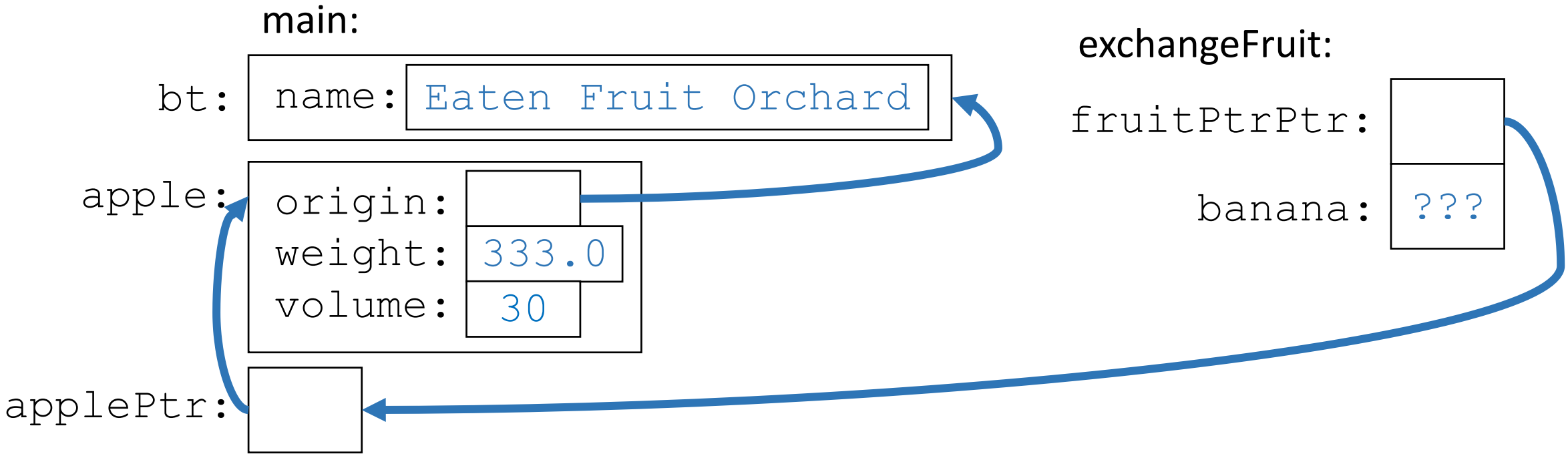

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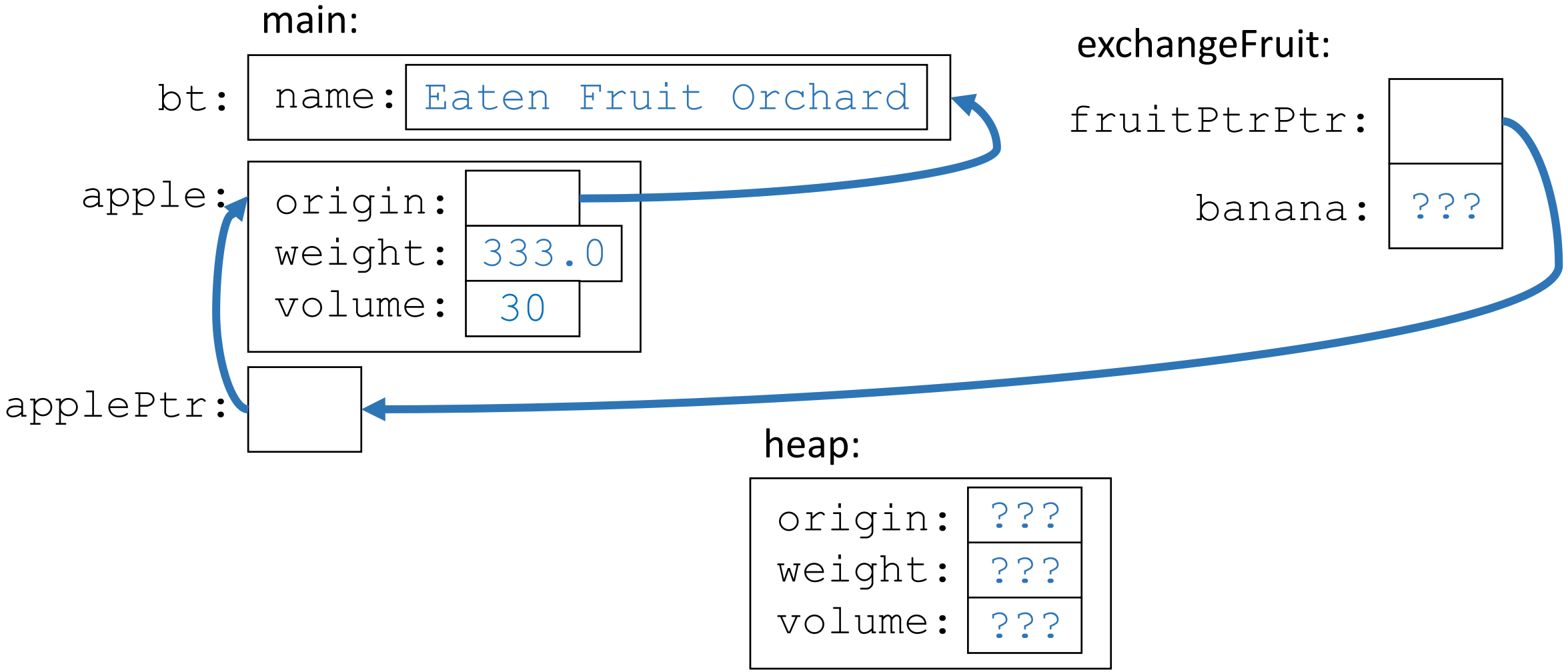

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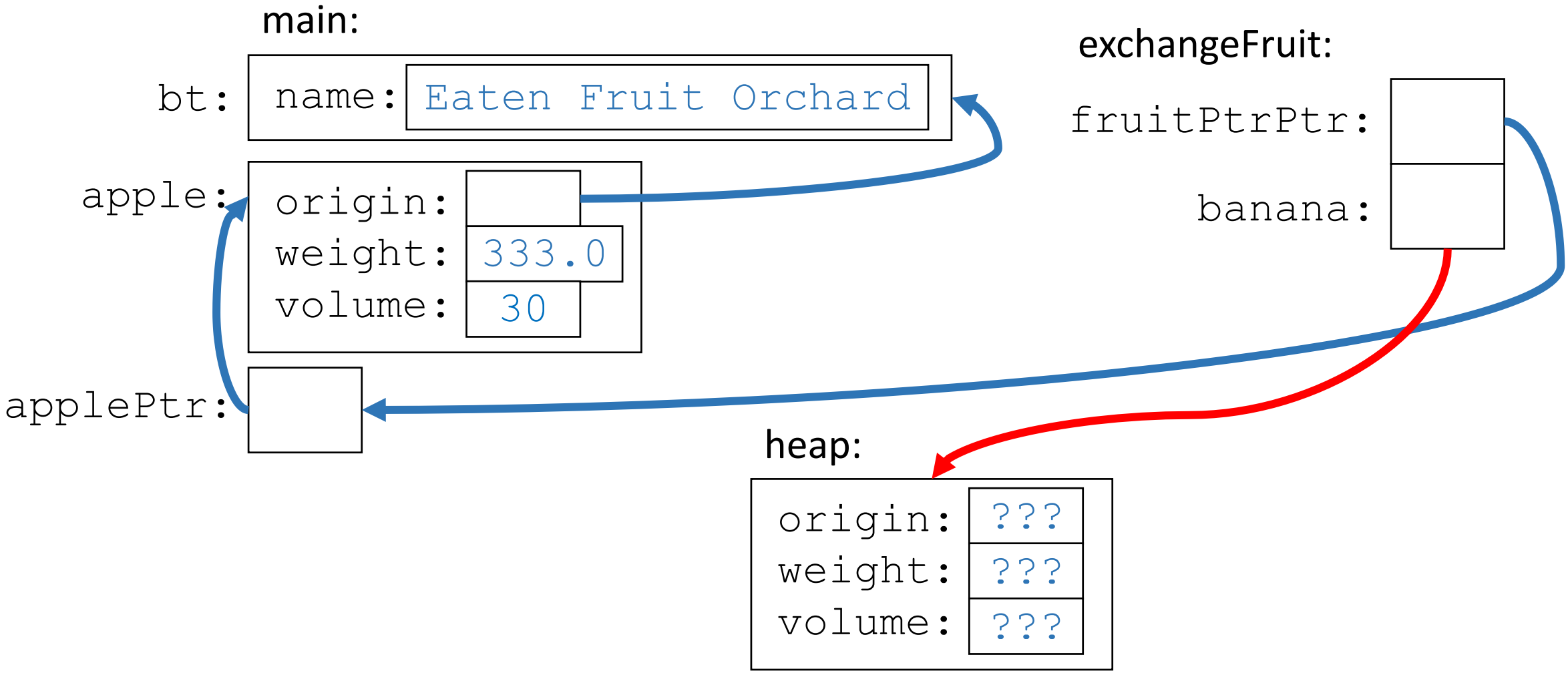

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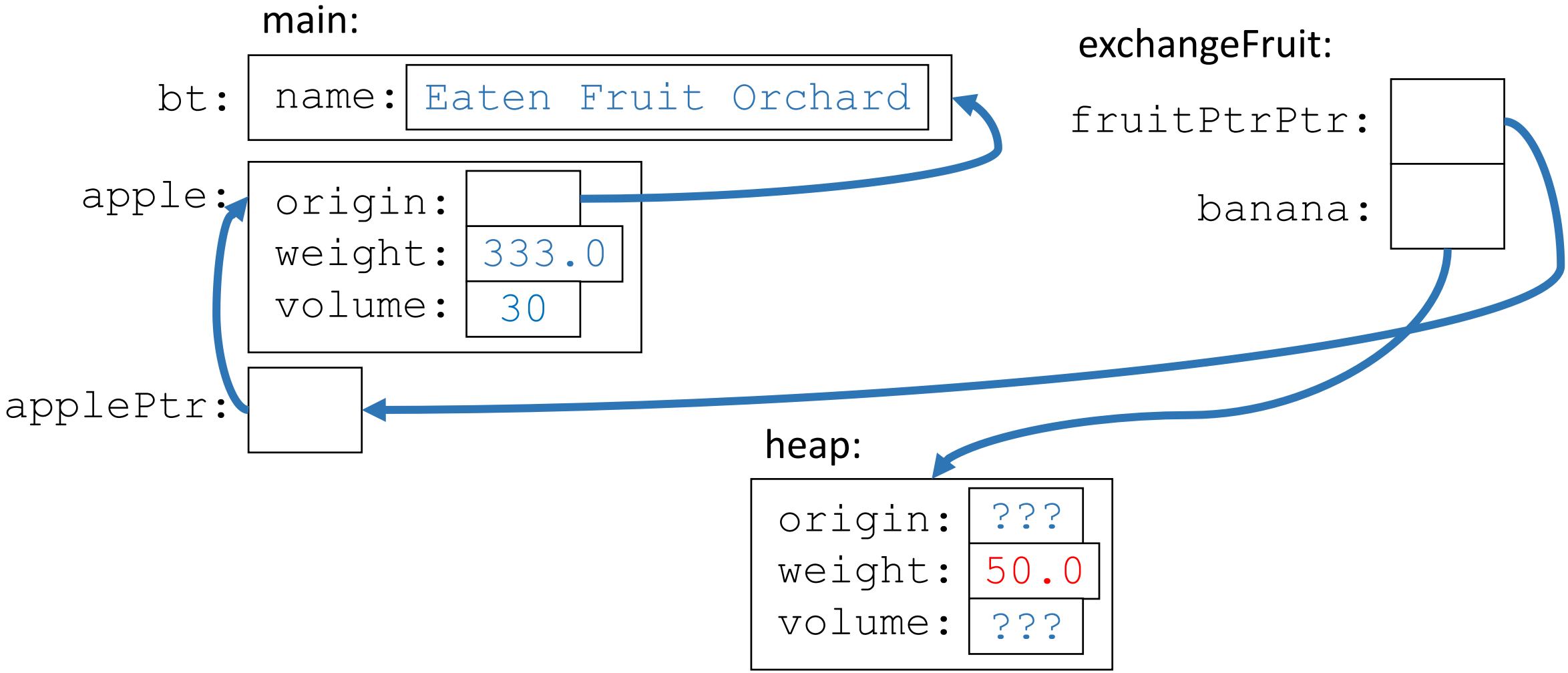

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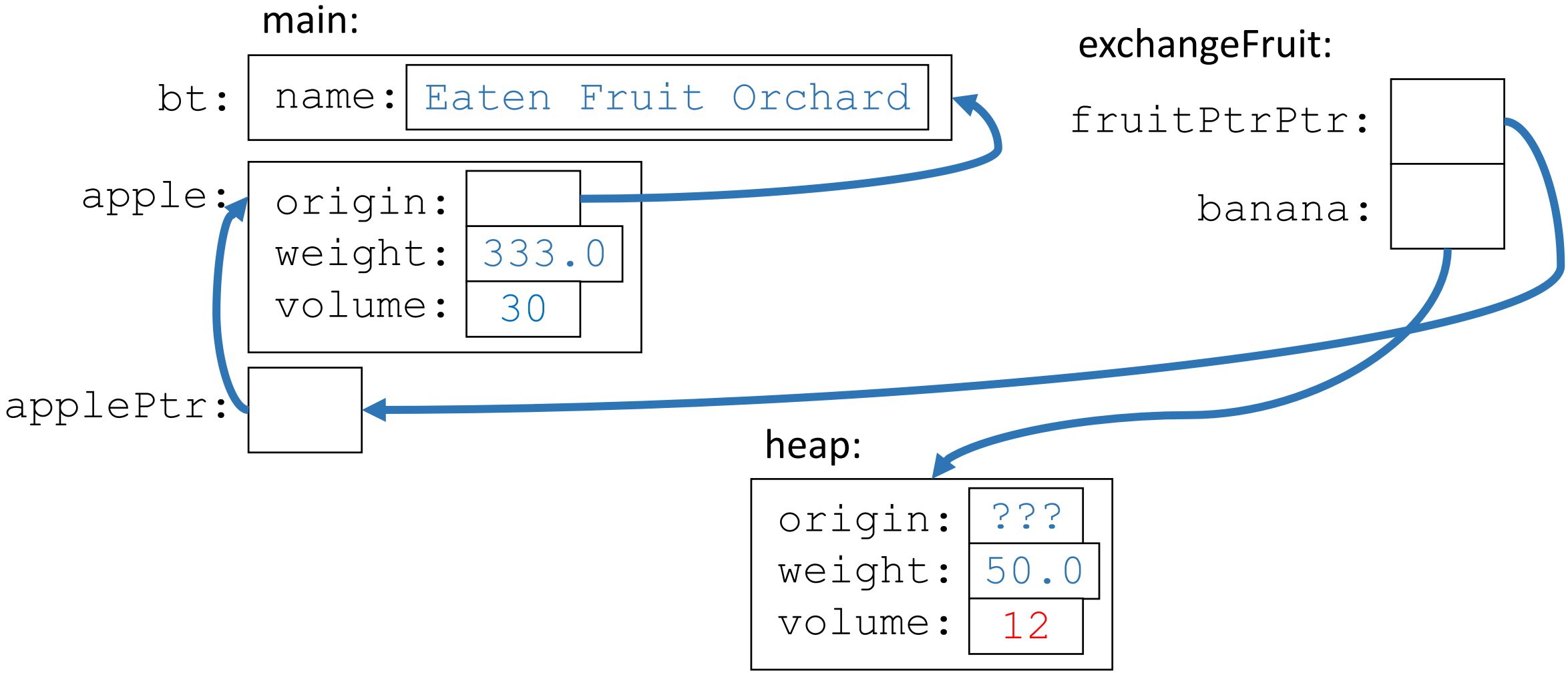

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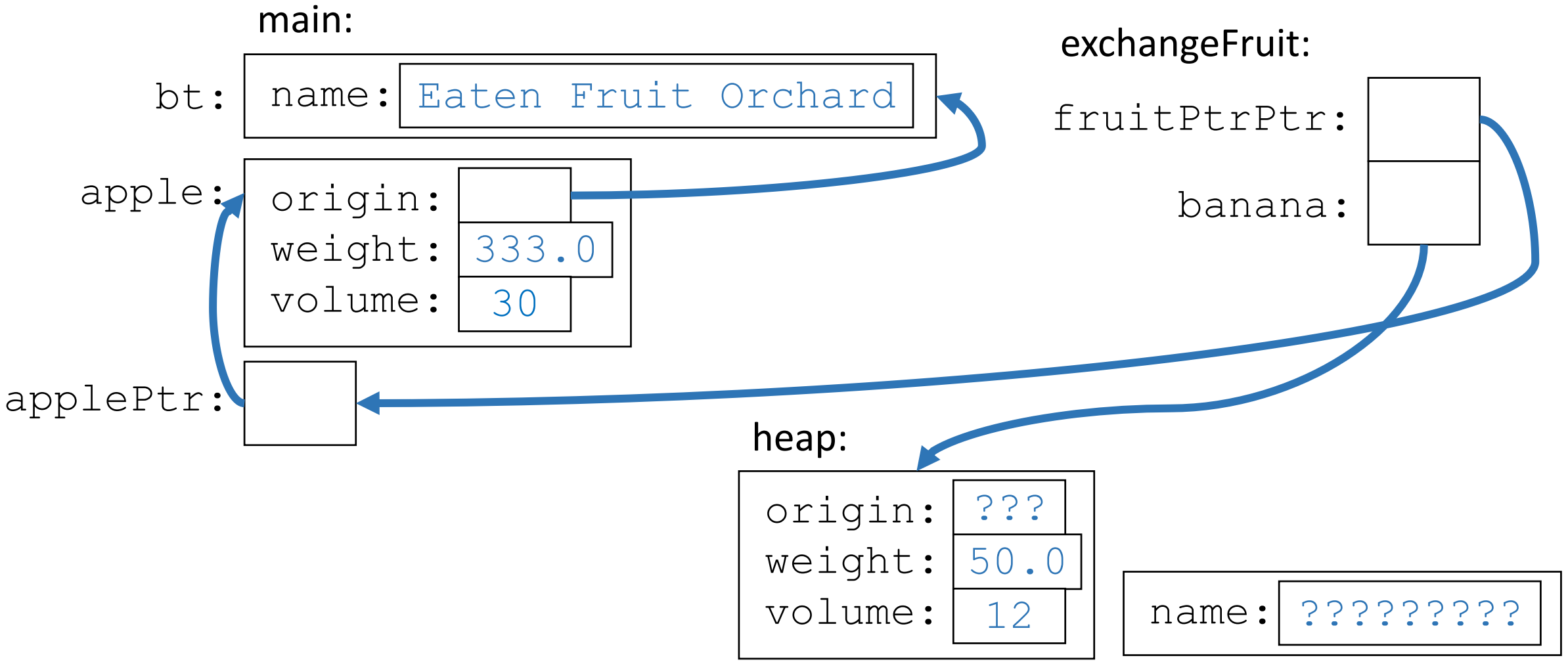

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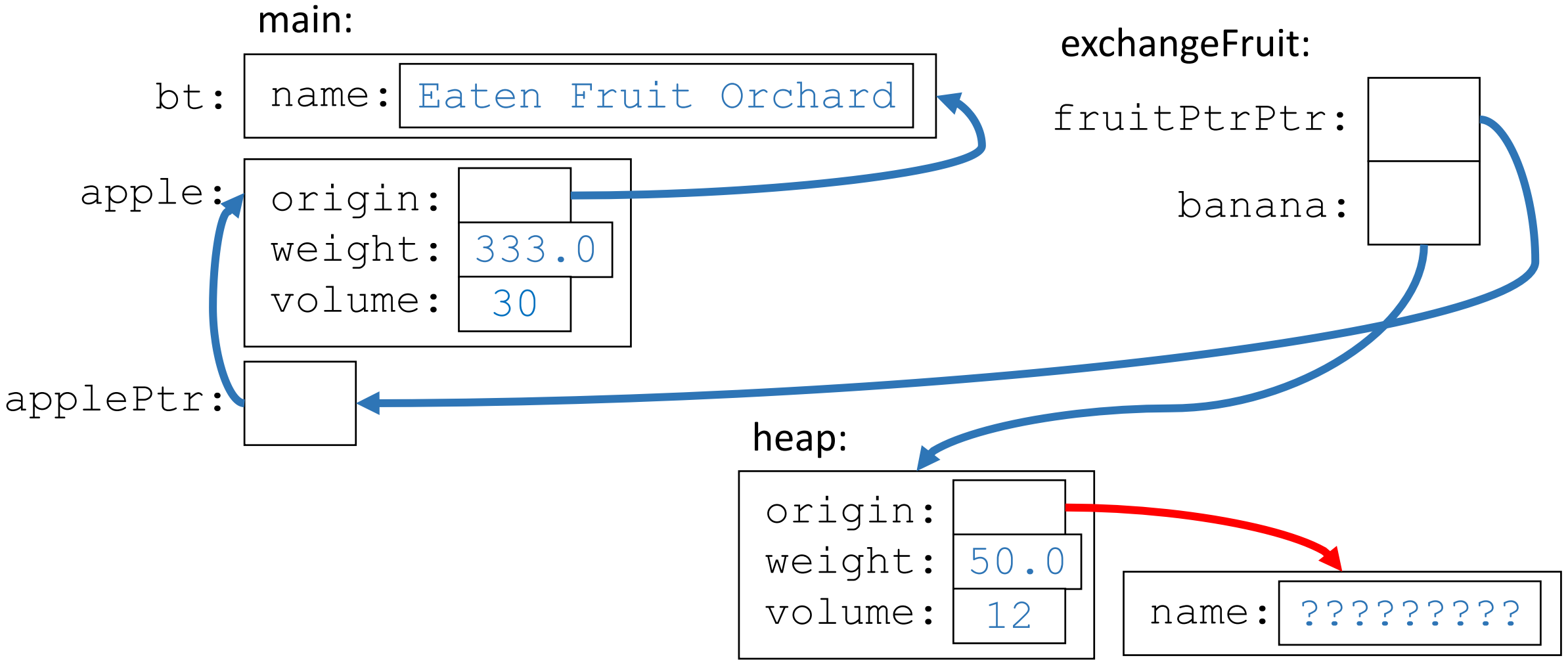

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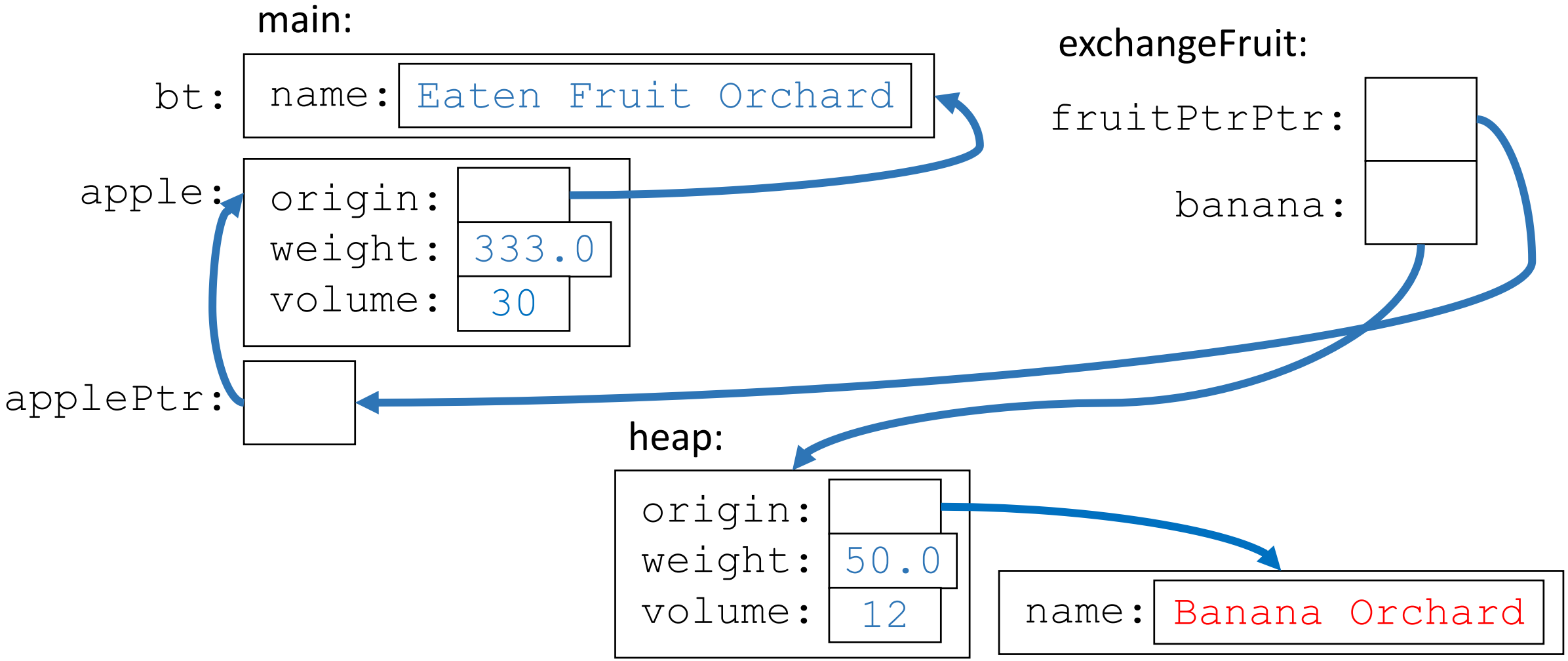

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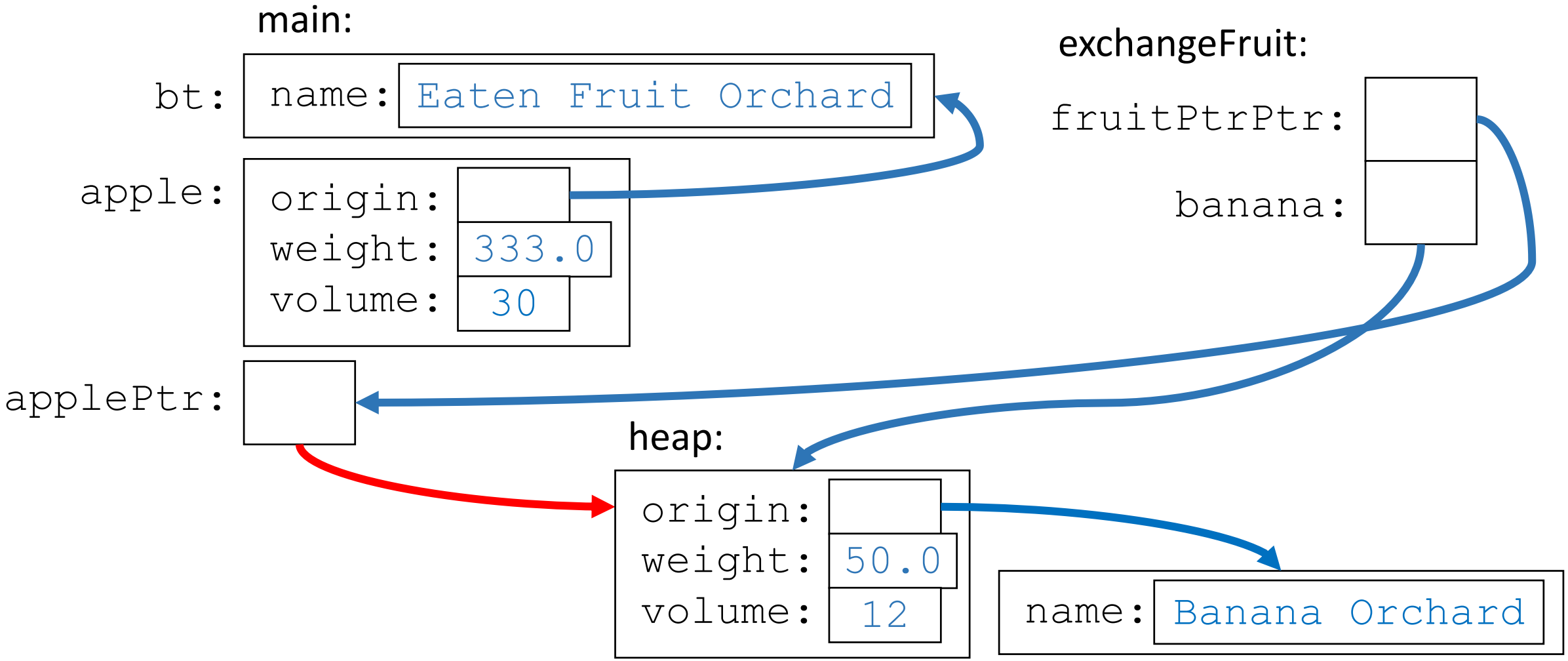

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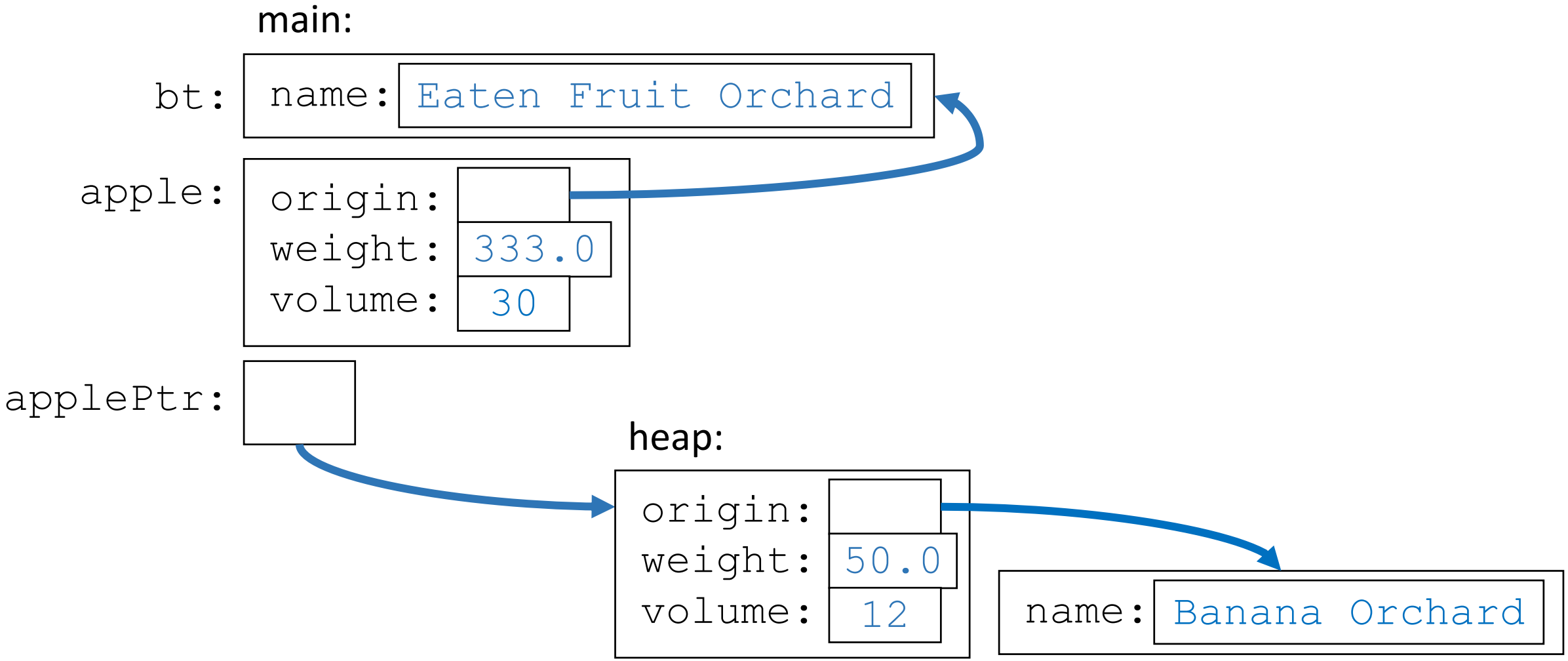
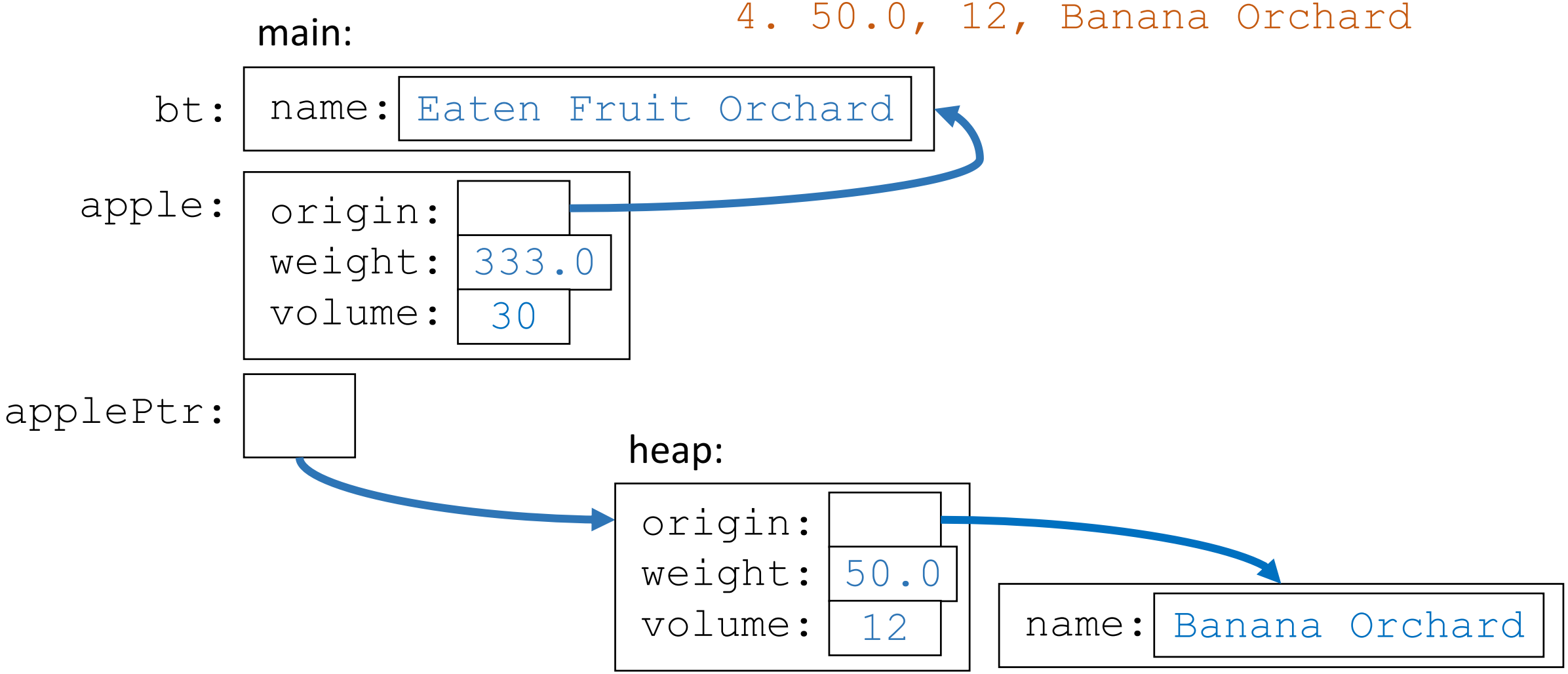


Worksheet Problem 1

1. 20.5, 33, Apple Orchard
2. 20.5, 23, Eaten Fruit Orchard
3. 333.0, 30, Eaten Fruit Orchard
4. 50.0, 12, Banana Orchard



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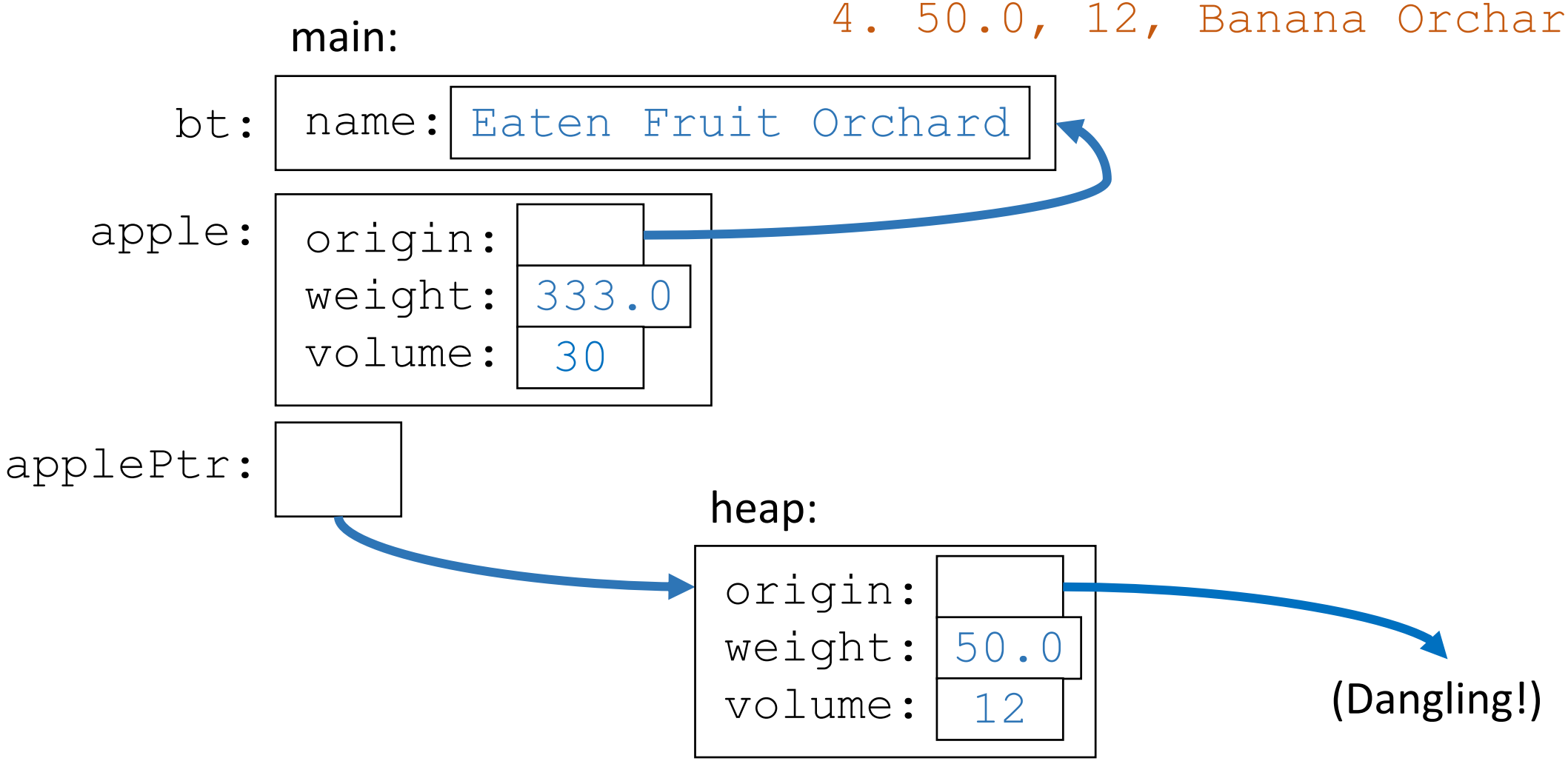

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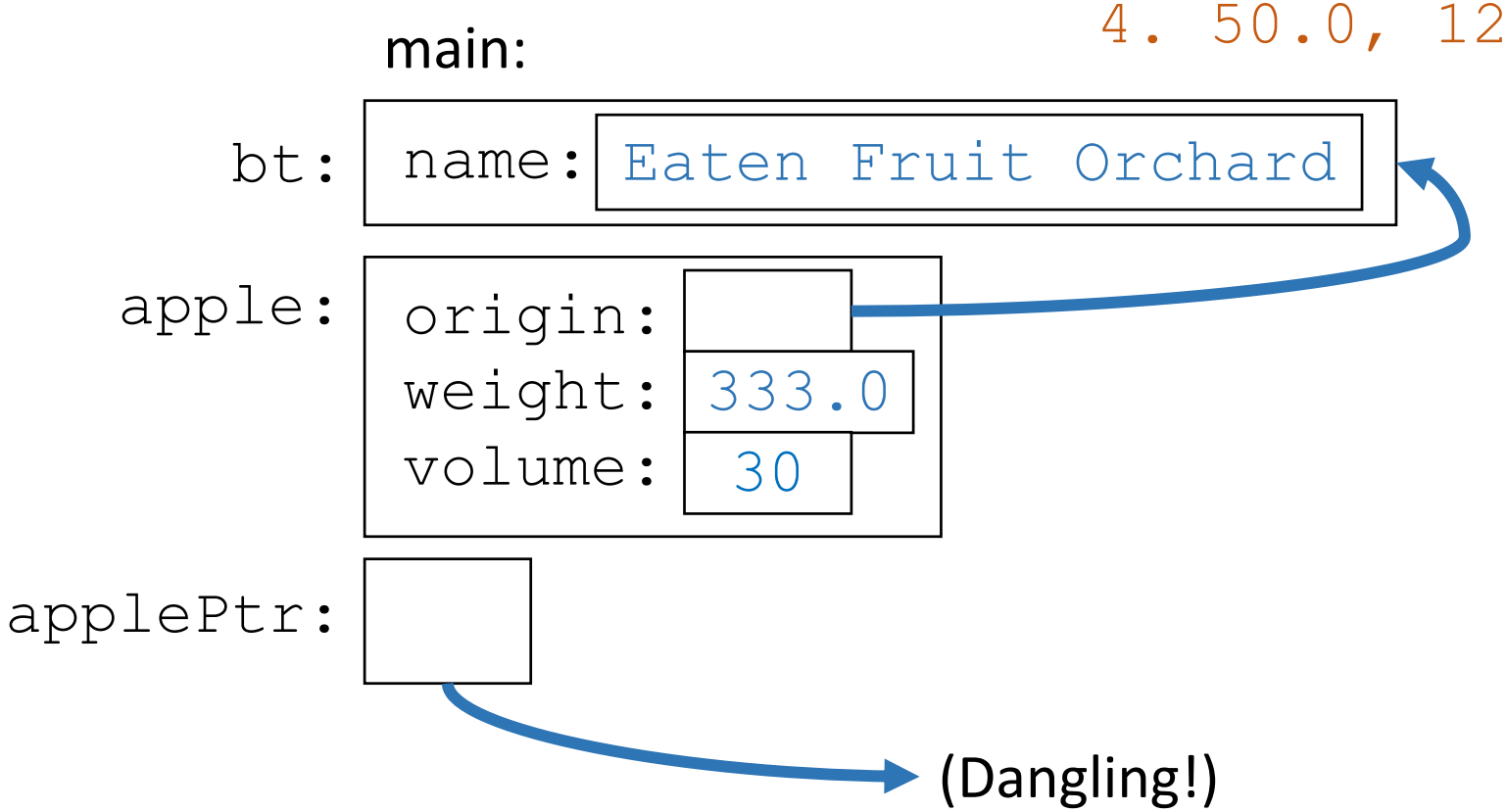
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