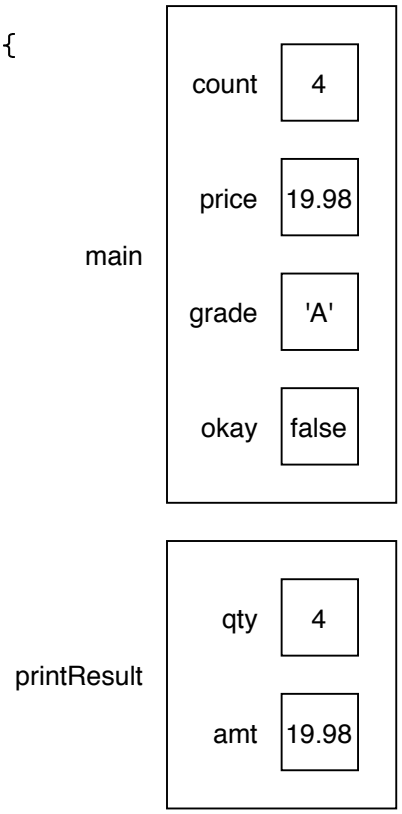
Local Variables

Consider the following example. The memory diagram shows the state of the program just before `printResult` returns for the second time:

```
public static void printResult(int qty, double amt) {
    System.out.printf("%d for $%.2f\n", qty, amt);
}

public static void main(String[] args) {
    int count = 3;
    double price = 9.99;
    char grade = 'A';
    boolean okay = true;
    printResult(count, price);
    count++;
    price *= 2;
    okay = !okay;
    printResult(count, price);
}
```



The output of the program is:

```
3 for $9.99
4 for $19.98
```

Questions (15 min)

Start time:

1. How many variables are declared ...

a) in `main`?

b) in `printResult`?

2. How many times is each variable assigned?

a) `count`

b) `price`

c) `grade`

d) `okay`

e) `qty`

f) `amt`

3. Is there a small box for each declaration or each assignment? Justify your answer.

4. What do the six small boxes in the memory diagram represent?

5. What do the two large boxes in the memory diagram represent?

6. Why does the diagram indicate that `count` is `4` and `price` is `19.98`, even though the source code says that `count = 3` and `price = 9.99`?

7. Based on the source code:

a) Which method is defined first?

b) Which method is executed first?

8. Copy the contents of *LocalVariables.java* into Java Visualizer. Click the "Visualize execution" button, and then click "Forward >" multiple times to see the code run.

a) What does the diagram look like on Step 11 of 19, just before `count++` executes?

b) Why is there no frame for the `printResult` method on Step 11 of 19?

c) Run the program to Step 17 of 19, just before `printResult` returns for the second time. What differences do you notice between the diagram on the previous page and the one on Java Visualizer?