Example Problems Using Array

Hui Chen

Department of Computer & Information Science

Brooklyn College

Objectives

- To apply arrays in application development (**AnalyzeNumbers**, **DeckOfCards**) (§§7.3–7.4)
- To copy contents from one array to another (§7.5)

Problem. Analyze Numbers

- Read one hundred numbers, compute their average, and find out how many numbers are above the average

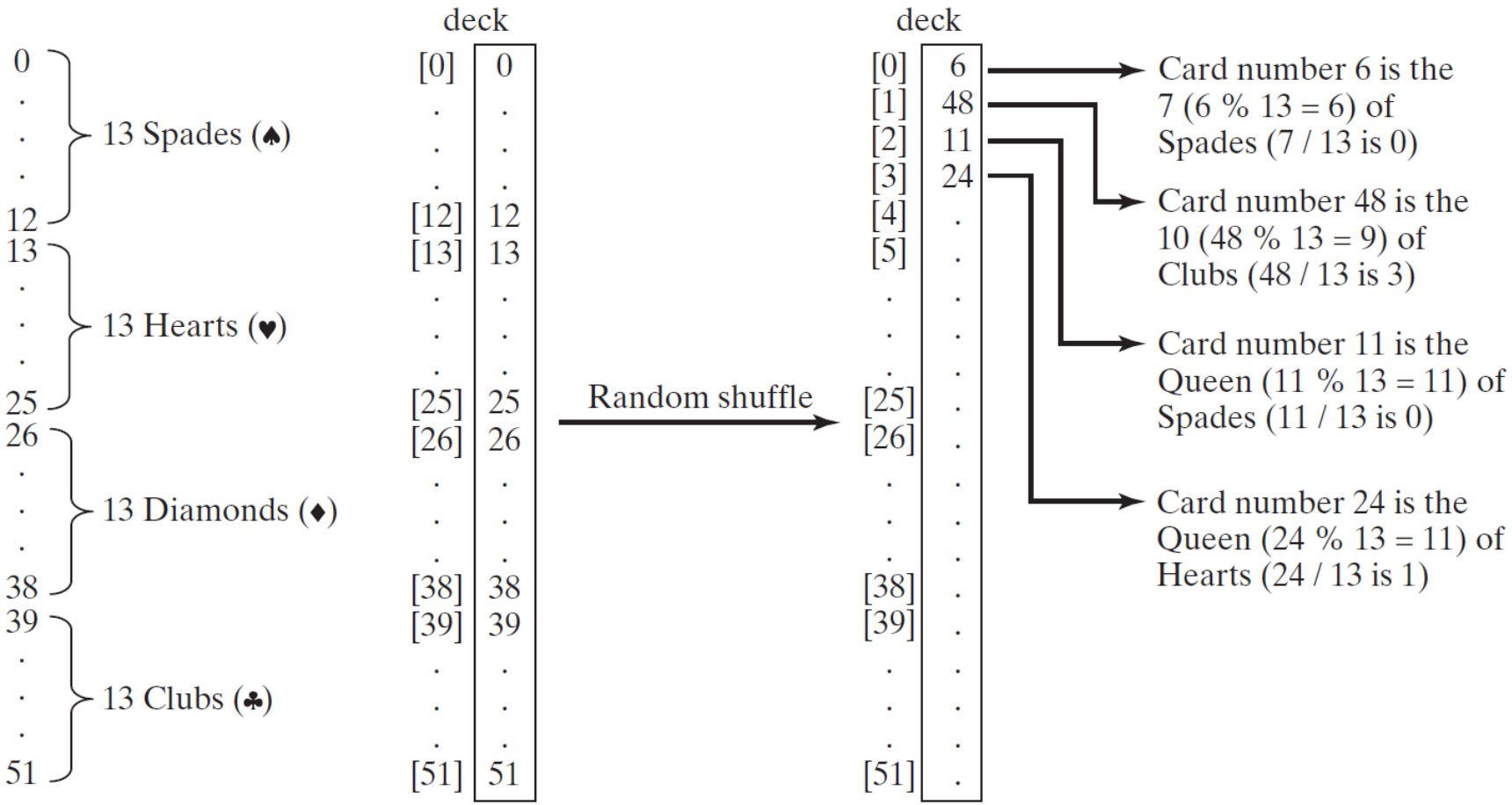
Questions?

Problem. Deck of Cards

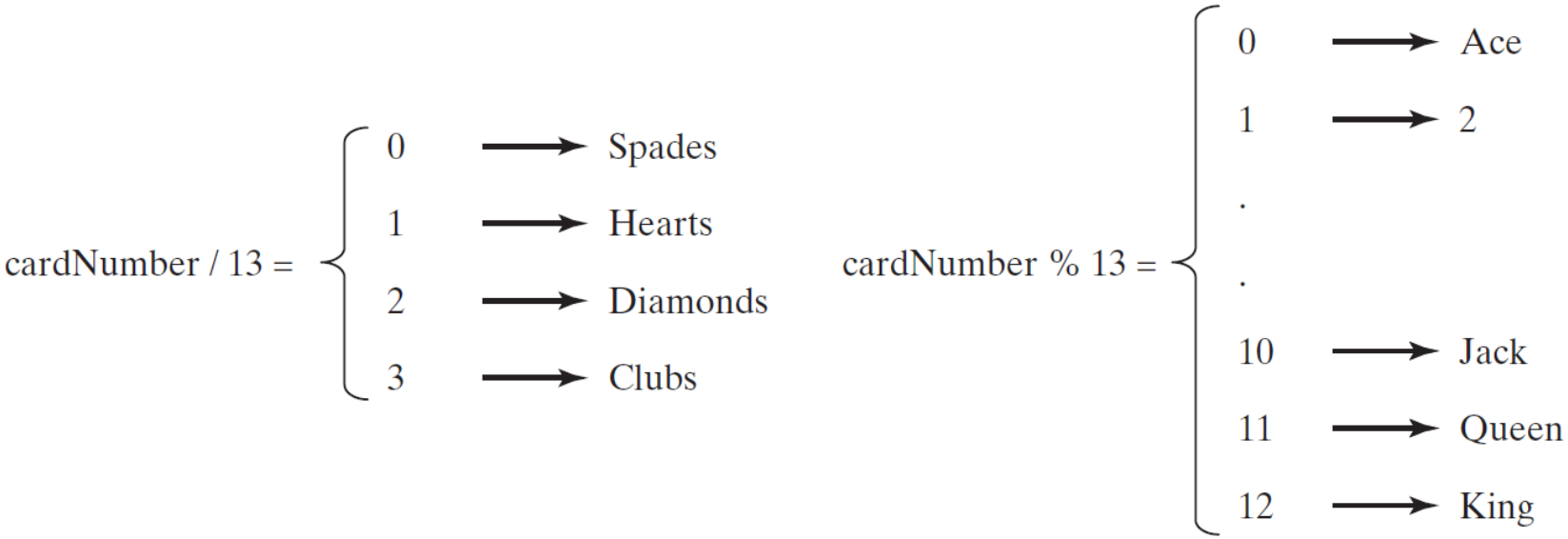
- The problem is to write a program that picks four cards randomly from a deck of 52 cards.
- All the cards can be represented using an array named deck, filled with initial values 0 to 51, as follows

```
int[] deck = new int[52];
// Initialize cards
for (int i = 0; i < deck.length; i++) {
  deck[i] = i;
}
```

Solution. Deck of Cards



Solution. Deck of Cards Continued



Questions?

Copying Arrays

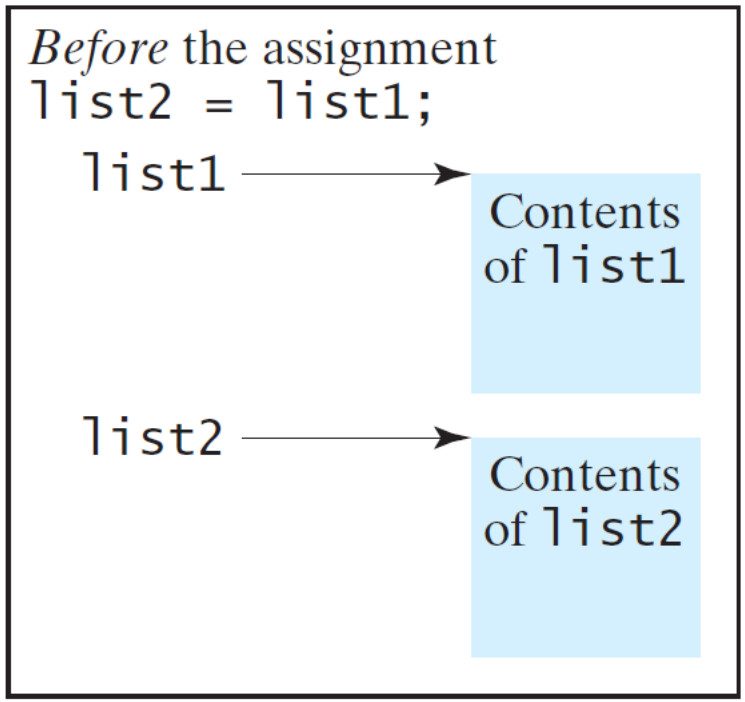
- Often, in a program, you need to duplicate an array or a part of an array.
- How?

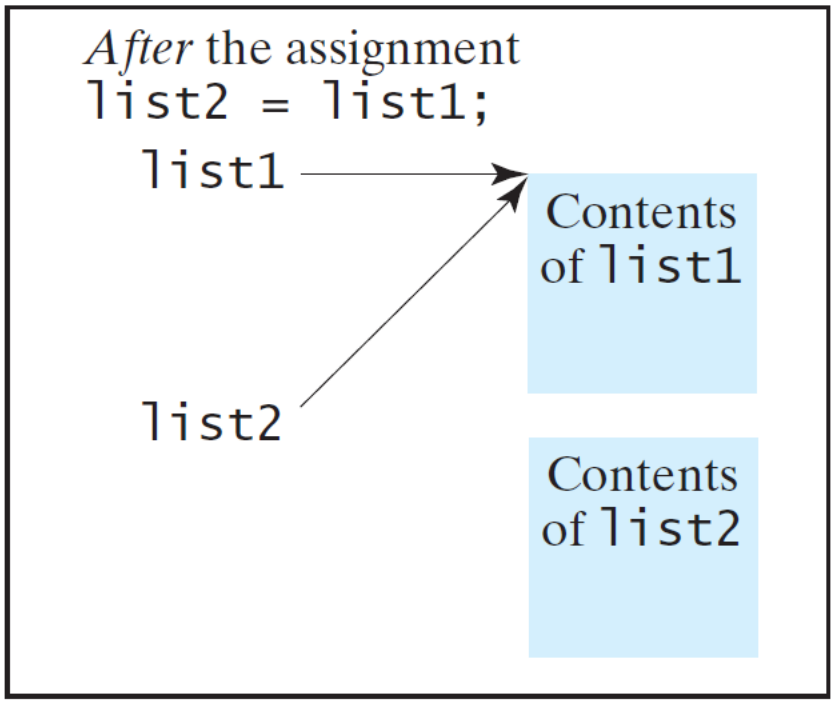
How about this?

```
list2 = list1;
```

How about this?

list2 = list1;





Copying Arrays Using Loop

- Using a loop:

```
int[] sourceArray = {2, 3, 1, 5, 10};
int[] targetArray = new int[sourceArray.length];

for (int i = 0; i < sourceArrays.length; i++) {
   targetArray[i] = sourceArray[i];
}
```

Copying Arrays Using System.arraycopy

- The System.`arraycopy` method

  arraycopy(sourceArray, src_pos, targetArray, tar_pos, length);

- Example:

  System.arraycopy(sourceArray, 0, targetArray, 0, sourceArray.length);

Questions?

Exercise 1

- Prerequisite. Prepare a text file called input.txt. Enter 10 numbers in the file.
- Problem. Read 10 numbers, compute the average, compute the standard deviation, and find out how many numbers are above the average.
- Implement two solutions
  - Without using arrays
  - Using an array

$$\mu = \frac{1}{n}\sum_{i=1}^{n} x_i \qquad \delta = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \mu)^2}$$

- (Optional) Write a comment in the Java file that uses an array and in the comment discuss advantage/disadvantage of using arrays and without using arrays
- Submit this exercise as part of the journal.

Exercise 2

- All the cards can be represented using an array named deck, filled with initial values 0 to 51
- Problem.
  - Write a program that first shuffle the cards, pick 4 cards randomly from the deck, and print out the picked cards.