Chapter 6 – Arrays - AP

Chapter Objectives

- Define and Use Arrays
- Describe how arrays and array elements are passed as parameters.
- Explore how arrays and other objects can be combined to manage complex information.
- Explore searching and sorting with arrays.
- Learn to use multidimensional arrays.
- Examine the ArrayList class.

Chapter Overview: This chapter is designed to give you an introduction to information stored in indexed data structures. Topics explored include built in arrays, arrays of objects, and the use of the Java Collection Class ArrayList. Several very important algorithms such as searching and sorting are also explained here.

Multiple Choice: 6.1 – 6.9

True/False: 6.1 – 6.8, 6.10

Short Answer: 6.1 – 6.8

AP Multiple Choice: 6.1 – 6.6

AP Style Free Response: 6.1

Worksheets: Array/ArrayList, Insertion Sort, Selection Sort

Programming Projects: 6.1, 6.6

Project 6.6 – Bank Account with ArrayList

ATM class (driver)

- Remember your import
- (create arraylist) ArrayList<Bank> accounts = new ArrayList<Bank>();
- (create an account in your list and send the name and initial amount to the constructor) accounts.add(new Bank("Mr. Nelson", 400000));
- (withdraw money from the account in spot 0 ("Mr. Nelson's" account)) accounts.get(0).withdraw(250);
- (print Mr. Nelson's balance) System.out.println(accounts.get(0).getBalance());
- Test the ATM class with multiple accounts to multiple methods.

Bank class

- Remember your three components: instance variables, constructor, methods
- Methods: getName, setName, deposit, withdraw, getBalance, toString and addInterest (adds 3% interest to the balance).

Name_____

Insertion Sort

1. Practice sorting the following data using Insertion Sort. Write the correct sequence of integers for each value of outer after its inner loop has been completed:

outer	83	95	44	37	38	72
1	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	_____

2. Rewrite the Insertion Sort method to sort words using the String class.

3. Use your code in #2 to practice sorting words using Insertion Sort. Write the correct sequence of words for each value of outer after its inner loop and insertion have been completed:

outer	far	don't	trees	from	fall	apples
1	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____
5	_____	_____	_____	_____	_____	_____

Name_____

Selection Sort

1. Practice sorting the following data using Selection Sort. Write the correct sequence of integers for each value of outer after its inner loop has been completed:

outer	20	2	10	34	83	29
0	_____	_____	_____	_____	_____	_____
1	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____

2. Rewrite the Selection Sort method to sort words using the String class.

3. Use your code in #2 to practice sorting words using Selection Sort. Write the correct sequence of words for each value of outer after its inner loop and swap have been completed:

outer	programs	java	always	very	well	document
0	_____	_____	_____	_____	_____	_____
1	_____	_____	_____	_____	_____	_____
2	_____	_____	_____	_____	_____	_____
3	_____	_____	_____	_____	_____	_____
4	_____	_____	_____	_____	_____	_____

Array and ArrayList Practice

Determine the output of the following code.

```
int [] myArray = new int [5];

for (int i = 0; i < myArray.length; i++)
{
    myArray[i] = 3 *i + Math.pow( i, 2);
}
for (int numbuh : myArray)
    System.out.println(numbuh);
```

Determine the output of the following code.

```
int [][] wackyArray = new int [4][4];

for (int k = 0; k < 4; k++)
{
    for (int j = 0; j < 4; j++)
    {
        wackyArray[k][j] = k * j;
    }
}
for (int k = 0; k < 4; k++)
{
    for (int j = 0; j < 4; j++)
    {
    System.out.print(wackyArray[k][j] + "  ");
    }
System.out.println();
}
```

Determine the output of the following code.

```
import java.util.*;
public class MysteryPhrase
{
        public static void main (String[] args)
          {
           ArrayList<String> phrase = new ArrayList<String>();

           phrase.add("for");
           phrase.add("ace");
           phrase.add("Chapter");
           phrase.set (0, "I'm");
           phrase.add("test");
           phrase.add(1, "gonna");
           phrase.add(3, "the");
           phrase.remove(phrase.size()-2);
           phrase.add(4, "AP");


      for (int j = 0; j < phrase.size()-1; j++)
        System.out.print(phrase.get(j)+ " ");

          }
    }
```

Note the three differences in calling lengths. It is important to keep these straight.

Arrays	.length
Strings	.length();
ArrayList	.size();

