Montgomery College, CMSC 203
Worksheet 2
Module 10

Objectives

- Introduction to Arrays
- Arrays of objects
- Ragged arrays
- Passing arrays to methods
- Returning arrays

Concept Questions

1.When an array is passed to a method:

a. a reference to the array is passed
b. it is passed just as an object
c. the method has direct access to the original array
d. All of the above

ANS: D

2.When an individual element of an array is passed to a method:

a. a reference to the array is passed
b. it is passed like any other variable
c. the method does not have direct access to the original array
d. All of the above

ANS: C, B

3.What will be returned from the following method?

```
public static float[] getValue(int x)
```

a. A float value
b. An array of float values
c. An integer
d. An array of integers

ANS: B

4.What will be the value of `x[1]` after the following code is executed?

```
int[] x = {22, 33, 44};
arrayProcess(x);
…
public static void arrayProcess(int[] a)
```

```
{
   for(int k = 0; k < 3; k++)
   {
      a[k] = a[k] + 5;
   }
}
```

a. 27
b. 33
c. 38
d. 49

ANS: C

5.What will be the value of `x[1]` after the following code is executed?

```
int[] x = {22, 33, 44};
arrayProcess(x[1]);
...
public static void arrayProcess(int a)
{
   a = a + 5;
}
```

a. 27
b. 33
c. 38
d. 49

ANS: B

6. What do you normally use with a partially-filled array?

a. A class that does nothing but manage the array
b. An accompanying parallel array
c. An accompanying integer value that holds the number of items stored in the array
d. An accumulator

ANS: C

Fill in the blanks. Find the smallest element of this partially filled array.

```
int [] arr = new int[10];
int numOfElements = 5;
```

```
arr[0] = 54; arr[1] = 86;
arr[2]=6; arr[3]=58; arr[4]=4;

int smallest = ____________;

for(int i=__; i<__________; i++){
     if(_______________){
          smallest = arr[i];
     }
}
```

ANSW:

```
public static void main(String[] args){
          int [] arr = new int[10];
          int numOfElements = 5;

          arr[0] = 54; arr[1] = 86;
          arr[2]=6; arr[3]=58; arr[4]=4;

          int smallest = arr[0];

          for(int i=1; i<numOfElements; i++){
               if(arr[i]<smallest){
                    smallest = arr[i];
               }
          }

          System.out.println(smallest);
     }
```

Given the following two-dimensional array declaration, which statement is true?

```
int [][] numbers = new int [6][9];
```

a. The array numbers has 6 columns and 9 rows
b. The array numbers has 6 rows and 9 columns
c. The array numbers has 15 rows
d. The array numbers has 54 rows

ANS: B

For the following code, what would be the value of `str[2]`?

```
String[] str = {"abc", "def", "ghi", "jkl"};
```

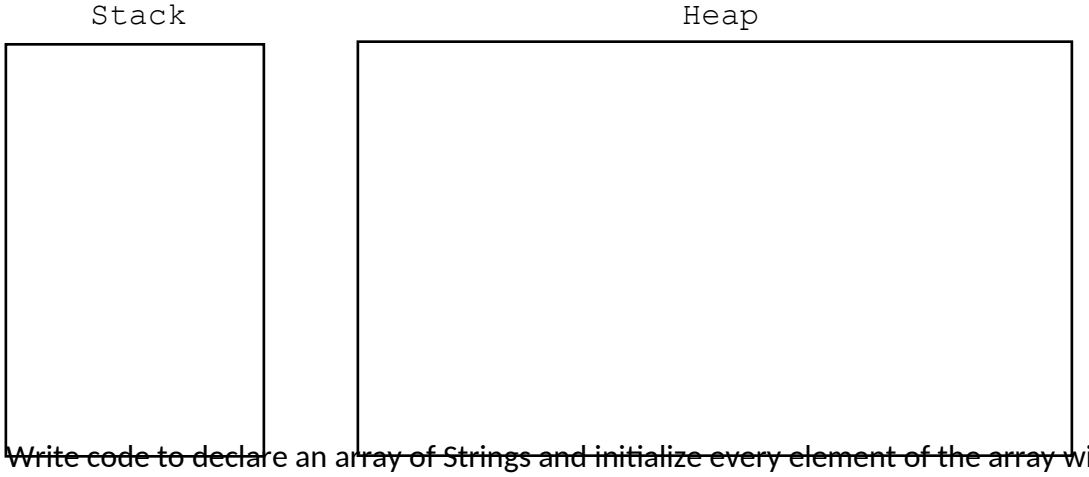
a. "ghi"

b. "def"
c. A reference to the String "ghi"
d. A reference to the String "def"

ANS: C

Draw a memory map of this array:

```
String[] str = {"abc", "def", "ghi", "jkl"};
```



Write code to declare an array of Strings and initialize every element of the array with the string "init".

ANSW:

```
String[]  arr = new String[5];
for(int i = 0; i<arr.length; i++){
     arr[i] = "init";
}
```

Given the following Book class, write code which will declare and initialize an array of 5 books.

```
class Book{
     private String title;
     private String author;
     private double price;

     public Book(String title, String author, double price){
          this.title = title;
          this.author = author;
          this.price = price;
     }
}
```

ANSW:

```
Book[]  arr = new Book[5];
for(int i = 0; i<arr.length; i++){
     arr[i] = new Book("Title", "author", 54);
```

```
}
```

Programming Questions

1. Write a program which will create an array of Strings and prompt the user to enter every element:
   - Create a method `showArr(String[] arr)` which will display the array.
   - Create a method `initArr(String[] arr)` which will prompt the user to enter every element of the array.
   - In the main method, prompt the user to enter the size of the array. Next, create the array of specified size and pass it to the `initArr` function. Lastly, display the array using `showArr` method.

   ANSW:

```
import java.util.Scanner;

public class Main {
	private static Scanner sc = new Scanner(System.in);

	public static void main(String[] args){
		System.out.print("Enter size: ");
		int size = sc.nextInt();
		sc.nextLine();
		String[]  arr = new String[size];
		initArr(arr);
		showArr(arr);
	}

	public static void showArr(String[] arr){
		System.out.println("Printing arr: ");
		for(int i=0; i<arr.length; i++){
			System.out.println(arr[i] + " ");
		}
	}

	public static void initArr(String[] arr){
		for(int i=0; i <arr.length; i++){
			System.out.print("Enter elem ["+i+"]: ");
			arr[i] = sc.nextLine();
		}
	}
}
```

2. Given the following `Book` class, write a program which will prompt the user to enter information about 3 books. After that you will find the book with the smallest price and display it to the user.

```
class Book{
	private String title;
	private String author;
	private double price;

	public Book(String title, String author, double price){
```

```
		this.title = title;
		this.author = author;
		this.price = price;
	}

	public String getTitle() {
		return title;
	}

	public String getAuthor() {
		return author;
	}

	public double getPrice() {
		return price;
	}
}
```

- Create a `show(Book b)` method, which will display a book
- Create a `findCheapest(Book[] arr)` method which will find the cheapest book and return it
- Create a `initArr(Book[] arr)` method which will initialize the array of books by prompting the user to enter information
- In the main method, declare an array of `Book` objects of size 3. Use the `initArr` method to prompt the user to enter the information about the book. Next, use the `findCheapest` to find the cheapest book. Use the `show` method to display the cheapest book that was returned.

ANSW:

```
import java.util.Scanner;

public class Main {
	private static Scanner sc = new Scanner(System.in);

	public static void main(String[] args){
		Book[] arr = new Book[3];
		initArr(arr);
		Book cheapest = findCheapest(arr);
		show(cheapest);
	}

	public static void show(Book b){
		System.out.println("Title: "+b.getTitle()+" author:
"+b.getAuthor()+" price: "+b.getPrice());
	}

	public static Book findCheapest(Book[] arr){
		double cheapest = 100000;
		Book b = null;
		for(int i = 0; i < arr.length; i++){
			if(arr[i].getPrice()<cheapest){
```

```
                        b = arr[i];
                        cheapest = arr[i].getPrice();
                    }
                }

                return b;
        }

        public static void initArr(Book[] arr){
                for(int i=0; i <arr.length; i++){

                        System.out.print("Enter ["+i+"] title: ");
                        String title = sc.nextLine();
                        System.out.print("Enter ["+i+"] author: ");
                        String author = sc.nextLine();
                        System.out.print("Enter ["+i+"] price: ");
                        Double price = sc.nextDouble();
                        sc.nextLine();

                        arr[i] = new Book(title, author, price);
                }
        }
}
```