

## Seminar 4 (Arrays, Methods) Exercises

1. The day of a week is declared in an array as follows in a program:  

```
String[] days = {"Monday", "Tuesday", "Wednesday", "Thursday", "Friday",  
                "Saturday", "Sunday"};
```

  - a. Write a program that has 1 integer parameter value and prints the word equivalent of the day. Assume the number will be between 1-7, 1 representing Monday. You should not use any if...else statements.
  - b. Print a table of the days of the week as follows:  
1 Monday  
2 Tuesday  
...  
7 Sunday
2. Declare an integer array of size 5.

Write separate **loop** structures for each of the following:

- a. Read (using Scanner class) in 5 values into each element of the array.  
Example of input is as follows:  
Enter value 1: 99  
Enter value 2: 88  
...
  - b. Increment all the elements of the array by 1.
  - c. Display the sum of all the numbers in the array.
  - d. Search for a number in the array. If found, display a message that the number is found.
  - e. Display the smallest number.
  - f. Declare another integer array y of the same length as x. Copy the values of each element in x to y. Display the elements in y to confirm it has been copied correctly.
3. A test consists of 10 MCQ questions. Each question has 4 choices: a, b, c, d. The solution to each question is stored in an array as follows:  

```
char[] mcq = { 'a', 'b', 'b', 'a', 'd', 'c', 'b', 'a', 'b', 'c' };
```

That means the answer to question 1 is a, question 2 is b, etc.

Write a program that prompts for the answers to the 10 MCQ questions. Store the answers in another array of char. (Use the charAt(n) to get the first char of a String). An input sample is as follows:

```
Q1: a  
Q2: b  
Q3: c  
...  
Q10: d
```

After all input, display if each of the questions answered is correct, and if not, display the correct answer. A summary of the number of correct answers is also displayed.

Output:

Q1: a correct

Q2: b correct

Q3 c incorrect, answer is b

...

Q10: d incorrect, answer is c

Total 7 out of 10 correct.

4. Trace the output of the following:

```
int[] x = {1, 2, 3, 4, 5};
```

```
for ( int i=0; i<x.length-1; i++){  
    x[i+1]=x[i+1] + x[i];  
}  
for ( int i=0; i<x.length; i++){  
    System.out.print( x[i] + " ");  
}
```

5. a. Write a static method `max` that has 2 double parameters. The method returns the larger of the 2 values. Test the method.
- b.. Write a static method `max` that has 3 double parameters. The method returns the largest of the 3 values. Make use of the `max` method in part a. Test the method.
6. Write a static method `getGrade` that has 1 double parameter representing a mark of an assessment. The method returns a String as follows:  
Distinction – 75 and above  
Credit – 50 to less than 75  
Fail – less than 50  
Write a main method to test the `getGrade` method.
7. a. Write a static method `reverse` that has a String parameter. The method returns the reverse of the string. E.g. if “abcde” is passed to the method, it returns “edcba”. Test the method.
- b. Write a static method `isPalindrome` that has a String parameter. The method returns true if the string is a palindrome. A palindrome is a string that reads the same in reverse. For example, “anna” is a palindrome. Make use of the reverse method in part a.
- c.. Write statements to test the `isPalindrome` method.

8. Reorganize each part of Q2 using method calls.
- Use a method `populateArray` that has the array as parameter. It populates the array as described in Q2a. No return values.
  - Use a method `incrementArray` that has 2 parameters – the array and a number that indicates the value to increment for each element of the array. No return values.
  - Use a method `computeTotal` that has 1 parameter – the array. The method sums all the elements of the array and returns this value.
  - Use a method `searchArray` that has 2 parameters – the array and a number to search. The method returns true if the number can be found in the array and false otherwise.
  - Use a method `findSmallest` that has 1 parameter – the array. It returns the smallest number in the array.
  - Use a method `copyArray` that has 2 parameters – 2 arrays. It copies the values in the first array to the second. No return value.
9. Trace the output of the following program:

```
public static void main(String[] args)
{
    int[] x = {1, 2, 3, 4, 5};
    int[] y = new int[5];

    for (int i=0; i<x.length; i++){
        y[i] = methodA( x[i]);
    }

    methodB(y);
    for (int i=0; i<x.length; i++){
        System.out.print(y[i] + " ");
    }
}

public static int methodA(int x){
    return x * 2;
}

public static void methodB(int[] x){
    for (int i=0; i<x.length; i++)
        x[i] += 1;
}
}
```

10. A check digit is usually appended to a code number in order to detect errors arising when the number is transcribed manually.

The check digit of the NRIC No. is the official reference which is determined as follows:

For example : NRIC No.(with official reference) = S 7928964 G

Step 1:

Multiply each digit by the following weights.

NRIC No. :	7	9	2	8	9	6	4
Weights :	<b>2</b>	<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>
Products:	14	63	12	40	36	18	8

Step 2:

Sum the products of each digit x weight.

Sum :  $14 + 63 + 12 + 40 + 36 + 18 + 8 = 191$

Step 3:

Find the remainder when the sum is divided by 11.

Sum/11: 17 remainder 4

Step 4:

Take 11 – remainder to get the check digit.

Check digit :  $11 - 4 = 7$

Step 5:

Look up the following table to get the official reference.

Official Reference : G

Conversion:	A	B	C	D	E	F	G	H	I	Z	J
Table	1	2	3	4	5	6	7	8	9	10	11

Write a method `getReference` that has a String parameter representing the NRIC( E.g. "1234567"). The method returns the official reference as a char.

Write a program that reads in a nric string and displays the reference by calling the `getReference` method. You should make use of arrays and not many if...else statements.