

## Lab 2 – Exercises

1. Write the methods with the following headers

```
// Return the reversal of an integer, i.e., reverse(456) returns 654
public static int reverse(int number)
// Return true if number is a palindrome
public static boolean isPalindrome(int number)
```

Use the `reverse` method to implement `isPalindrome`. A number is a palindrome if its reversal is the same as itself. Write a test program that prompts the user to enter an integer and reports whether the integer is a palindrome.

2. A *palindromic prime* is a prime number and also palindromic. For example, 131 is a prime and also a palindromic prime, as are 313 and 757. Write a program that displays the first 100 palindromic prime numbers. Display 10 numbers per line, separated by exactly one space, as follows:

```
2 3 5 7 11 101 131 151 181 191
313 353 373 383 727 757 787 797 919 929
...
```

3. The classic Eight Queens puzzle is to place eight queens on a chessboard such that no two queens can attack each other (i.e., no two queens are on the same row, same column, or same diagonal). There are many possible solutions. Write a program that displays one such solution. A sample output is shown below:

```
|Q| | | |Q| | |Q|
| | | | |Q| | |
| |Q| | | |Q| |
| | |Q| | | |Q|
|Q| | | | |Q| |
| | | |Q| | | |
```

(You can check different possible solution on the following link as well,  
[https://en.wikipedia.org/wiki/Eight\\_queens\\_puzzle](https://en.wikipedia.org/wiki/Eight_queens_puzzle) )

4. Write a program that repeatedly prompts the user to enter a capital for a state. Upon receiving the user input, the program reports whether the answer is correct. Assume that 50 states and their capitals are stored in a twodimensional array, as shown in Figure 8.10. The program prompts the user to answer all states' capitals and displays the total correct count. The user's answer is not case-sensitive.

Alabama	Montgomery
Alaska	Juneau
Arizona	Phoenix
...	...
...	...

```
What is the capital of Alabama? Montogomery ↵ Enter
The correct answer should be Montgomery
What is the capital of Alaska? Juneau ↵ Enter
Your answer is correct
What is the capital of Arizona? ...
...
The correct count is 35
```

5. Write a program that prompts the user to enter the number of students, the students' names, and their scores, and prints student names in decreasing order of their scores.