CPE 150 Laboratory 9: Arrays I

Department of Computer Engineering
Yarmouk University

Summer 2017

1 Objectives

- To declare arrays, initialize arrays and refer to individual array elements.
- To be able to pass arrays to functions.

2 Lab Exercise 1 - Rolling Dice

Write a program that simulates the rolling of two dice. The program should call `rand` to roll the first die, and should call `rand` again to roll the second die. The sum of the two values should then be calculated. [*Note*: Because each die has an integer value from 1 to 6, then the sum of the two values will vary from 2 ti 12 with 7 being the most frequent sum and 2 and 12 being the least frequent sums. Your program should roll the two dice $36,000$ times. Use a single-subscripted array to tally the numbers of times each sum appears. Print the results in a tabular format. Also, determine if the toals are reasonable, (i.e., there six ways to roll a 7), so approximately one sixth of all the rolls should be 7.

```
Sum      Total      Expected      Actual
  2       1000       2.778\%       2.778\%
  3       1958       5.556\%       5.439\%
  4       3048       8.333\%       8.467\%
  5       3979      11.111\%      11.053\%
  6       5007      13.889\%      13.908\%
  7       6087      16.667\%      16.908\%
  8       4996      13.889\%      13.878\%
  9       3971      11.111\%      11.031\%
 10       2996       8.333\%       8.322\%
 11       2008       5.556\%       5.578\%
 12        950       2.778\%       2.639\%
```

3 Lab Exercise 2 - Reverse a String

Write a program that asks the user to enter a string and then calls the function `reverse` to reverse the string in place, i.e., without the use of any temporary arrays. In addition to reversing the string, you need to convert each lower-case letter to an upper-case letter and vice versa. To achieve that, you can use `toupper` and `tolower` functions from the `cctype` library.

4 Lab Exercise 3 - Exam Grader

Your C++ instructor needs help in grading a True/False test. The program asks the teacher to enter the student ID and then his/her answers on the form: TFFTFFTTTXFFTFTFTFTT. The answer to question 1 is True, the answer to question 2 is False, and so on. This student did not answer question 9. The exam has 20 questions. Each correct answer is awarded two points, each wrong answer gets one point deducted, and no answer gets zero points. Write a program that processes the test data from the users. The output should be the student's ID, followed by the answers, followed by the test score, followed by the test grade. Assume the following grade scale: 90%–100%, A; 80%–89.99%, B; 70%–79.99%, C; 60%–69.99%, D; and 0%–59.99%, F.

5 Postlab Exercise

A palindrome is a string that is spelled the same way forwards and backwards. Some examples of palindromes are "radar," "able was i ere i saw elba" and (if blanks are ignored) "a man a plan a canal panama." Write a recursive or iterative function `testPalindrome` that returns `true` if the string stored in the array is a palindrome, and `false` otherwise. The function should ignore spaces and punctuation in the string.