



EASTERN UNIVERSITY, SRI LANKA
DEPARTMENT OF MATHEMATICS
FIRST YEAR EXAMINATION IN SCIENCE - 2016/2017
FIRST SEMESTER (AUG./SEP., 2018)
CS 1013 - INTRODUCTION TO PROGRAM DESIGN AND
PROGRAMMING
PRACTICAL

Answer all questions

Time allowed: Two Hours

Q1. The U.S. Census Bureau projects population based on the following assumptions:

- One birth every 7 seconds;
- One death every 13 seconds;
- One new immigrant every 45 seconds.

Assume the current population is 312,032 and one year has 365 days.

Write a Java program to display the population for each of the next three years.

Your program must contain the following functions:

- *birthPerYear()*: Returns the number of people born in a year;
- *deathPerYear()*: Returns the number of people dead in a year;
- *immigrantPerYear()*: Returns the number of people immigrated in a year.

[30%]

Q2. Write a Java program to play lottery. The program randomly generates a lottery of a two-digit number, prompts the user to enter a two-digit number, and determines whether the user wins according to the following rules:

1. If the user input matches the lottery number in the exact order, the award is Rs. 10,000.
2. If all digits in the user input match all digits in the lottery number, the award is Rs. 3,000.

3. If one digit in the user input matches a digit in the lottery number, the award is Rs. 1,000.

If a number is less than 10, assume the number is preceded by a 0 to form a two-digit number. For example, number 8 is treated as 08 and number 0 is treated as 00 in the program. (Hint: Use `Math.random()` method to generate random number.)

Eg:

Enter your lottery pick (two digits): 15

The lottery number is 15

Exact match: you win Rs. 10,000

Enter your lottery pick (two digits): 45

The lottery number is 54

Match all digits: you win Rs. 3,000

Enter your lottery pick: 23

The lottery number is 34

Match one digit: you win Rs. 1,000

Enter your lottery pick: 23

The lottery number is 14

Sorry: no match

Q3. Count positive and negative numbers and compute the average of numbers. Write a Java program that reads an unspecified number of integers, determines how many positive and negative values have been read, and computes the total and average of the input values (not counting zeros). Your program ends with the input 0. Display the average as a floating-point number. Assume that the maximum size of the array is 50.

Eg:

Enter an integer, the input ends if it is 0: 1 2 -1 3 0

The number of positives is 3

The number of negatives is 1

The total is 5.0

The average is 1.25