CSE321 Real-time and Embedded System Fall 2016

1 HWK2: BASE ARITHMETIC

1.1 GOALS

Here are the goals for this homework to:

- Be able to apply algorithmic problem solving skills you learned in CS1, CS2 and Data Structures courses.
- Improve your C language proficiency.
- Introduce yourself to CodeCon platform.
- Learn to use sensors on your android phone (/IOS). For this problem we will use accelerometer sensor to generate the two random numbers needed for the problem.

1.2 PROBLEM STATEMENT

A **base-n number** is a number that is made up of at most n symbols -

- Base-2 is a number with 0s and 1
- Base-10 is a number with digits in {0,1,2,3,4,5,6,7,8,9}
- Base-16 is a number with digits 0-9,A-F etc.

For this problem, you are required to do the following:

- Given a **number X** (X will be a number in a base between base-2 and base-16), find the **minimum base** that can be associated with X.
  Example: The minimum base associated 385 is base-9 (as it needs to have a base that supports the digit 8 which is its highest value digit). Similarly, the minimum base associated with B95 is base-12
- Convert X from this base to a value **X_10** in base-10
- Do the same for another number Y and call its value in base-10 as **Y_10**
- Print out the **sum** of these two numbers in base-10, ie **X_10 + Y_10**

1.3 INPUT SPECIFICATIONS

Your program will take

- A number **X** in base-m **(X >= 0, 2 ≤ m ≤ 16)**
- A number **Y** in base-n **(Y >= 0, 2 ≤ n ≤ 16)**
  You can assume that X and Y when converted to base-10 **will fit in** a long long (C).

1.4 OUTPUT SPECIFICATIONS

Based on the input, print out the **sum** of X_10 and Y_10

1.5 SAMPLE INPUT/OUTPUT

INPUT

```
B95
101101
```

OUTPUT

```
1742
```

EXPLANATION

B95 is in base-12. In base-10, its value is 1697. 101101 is in base-2. In base-10, its value is 45. 45 + 1697 = 1742

2 WHAT DO TO?

Read the problem and understand it. Think about approaches to solving the problem. Write down the algorithm (pseudo code).

1. Solve this problem using **CodeCon platform**. You are required to use C language only. That is the limitation for this problem on CodeCon. Your submissions will be auto-graded. Pay attention to the time and space limits. We will give you more information about CodeCon access very soon.
2. Code it in as an **Android app**. We will piggy-back on the app developed in Hwk1.
    a. You will port the code solved in CodeCon to android environment (Java).
    b. Instead of inputting two numbers, X, Y are derived from the accelerometer.
    c. Test the accelerator independently of the problem.
    d. Then interface the sensor accelerator to the problem.
    e. Email the inputs generated and output to yourself or any designated person.
    f. This will be graded by your TA after your demo it him/her, grades will be entered into ublearns.

3 DUE DATE: 10/14/2016 BY 4PM: HARD DEADLINE