

## Problem Set 4 Exercise #11: IC Check Code

**Reference:** Lecture 11 notes

**Learning objective:** Characters and Strings

**Estimated completion time:** 30 minutes

### Problem statement:

A Singapore IC starts with a prefix letter, followed by 7 digits and ends with another letter known as check code. Examples of ICs include “S8730215F” and “T1337984F”. The prefix letter is either ‘S’ (for those born before 2000) or ‘T’ (for those born after 2000).

Write a **non-OO** program **PS4\_Ex11\_ICCheckCode.java** that reads a prefix letter and a 7-digit positive integer representing an IC number, and then generates its check code.

The algorithm for generating IC check code is illustrated with the following example of IC number **1337984**.

Step 1: Multiply each digit with its corresponding weight **2, 7, 6, 5, 4, 3, 2** and add the products.

Example:  $1 \times 2 + 3 \times 7 + 3 \times 6 + 7 \times 5 + 9 \times 4 + 8 \times 3 + 4 \times 2 = 144$

Step 2: If the prefix letter of the IC is ‘T’, add **4** to the sum calculated in step 1. Example:  $144 + 4 = 148$ . Otherwise, if the prefix is ‘S’, keep the sum calculated in step 1 unchanged.

Step 3: Divide step 2 result by **11** to obtain the remainder. Example:  $148 \% 11 = 5$

Step 4: Match step 3 result in this table below for the check code.

Step 3 result	0	1	2	3	4	5	6	7	8	9	10
Check code	J	Z	I	H	G	F	E	D	C	B	A

Example: The check code corresponding to 5 is 'F'.

Your program should include a static method

```
char generateCode(char prefix, int num)
```

that takes in a prefix letter (an uppercase character of either ‘S’ or ‘T’) and an IC number (a 7-digit integer) as parameters, and returns corresponding check code (a character).

### Use tips:

This exercise can be done without using array and string, but will result in a long-winded program. Can you make use of array and string to shorten your code?

**Sample run #1:**

```
Enter prefix of NRIC: S  
Enter 7-digit NRIC number: 8730215  
Check code is F
```

**Sample run #2:**

```
Enter prefix of NRIC: S  
Enter 7-digit NRIC number: 1337984  
Check code is Z
```

**Sample run #3:**

```
Enter prefix of NRIC: T  
Enter 7-digit NRIC number: 1337984  
Check code is F
```

**Sample run #4:**

Check against your own IC.