# CSCE 240-001 – Program One

**Due:** 11:59pm on Tuesday, September 6

## Program Purpose

Convert a numeric value expressed in a base between 2 and 9, inclusive, to the base 10 expression of that value.

## Overview

In a positional numeration system with base b, each position represents a power of b. In the decimal system, which is a positional numeration system with base 10, each position represents a power of 10. So, for example, the decimal number 4809 represents $4 \cdot 10^3 + 8 \cdot 10^2 + 0 \cdot 10^1 + 9 \cdot 10^0$.

Similarly, in binary (positional numeration system base 2), each position represents a power of 2. For example, the binary number 11001 represents 1 * 2^4 + 1 * 2^3 + 0 * 2^2 + 0 * 2^1 + 1 * 2^0. So, the value 11001 in binary would be expressed as 25 in decimal.

For more detail and examples about positional numeration systems, read over the "Numeration Systems" PDF.

Your program should accept two integers input from the standard input device (use cin). The first integer is a numeric value and the second integer is the base in which that number is expressed. Your program should then output the number expressed in decimal (using cout).

### Example Input/Output Pairs

**Input:** 11001 2
**Output:** 25

**Input:** 132 8
**Output:** 90

**Input:** -112 7
**Output:** -58

This program only needs to convert numbers with bases between 2 and 9, inclusive. If a base input is outside of this accepted range, your program should output "Base Not Accepted" to the standard output device (using cout).

### Example Input/Output Pairs

**Input:** 105 16
**Output:** Base Not Accepted

The number of unique digits in a positional numeration system is equal to the base. In base 10, for example, the valid digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. And the binary numeration system uses the unique digits 0 and 1. If the number input uses invalid digits for the base entered, your program should output "Invalid Digit(s) In Number" to the standard output device (using cout).

### Example Input/Output Pair

**Input:** 130 2
**Output:** Invalid Digit(s) In Number

**Specifications**

- All output should be directed to the standard output device using cout.
- All input should be accepted from the standard input device using cin.
- Do not prompt for the input values.
- All of your source code for the program must be contained in a single file named *program1.cc*
- You will submit *program1.cc* to the assignment in Blackboard.
- Programs must compile and run on a computer of the instructor's choosing in the Linux lab (see your course syllabus for additional details).

**Testing**

A python script, *test_to_decimal.py*, has been provided for you to test your program with 5 sample input/output pairs. In order to use the tester, you'll need access to a python3 interpreter. Ensure that the tester and your program1 executable are in the same directory, and python3 is in your path. The commands to run the tester are given below:

```
python3 test_to_decimal.py 1
python3 test_to_decimal.py 2
python3 test_to_decimal.py 3
python3 test_to_decimal.py 4
python3 test_to_decimal.py 5
```

Your program will be graded using a similar python script with different input/output pairs.

**Grade Breakdown**

Style: 1 point
Documentation: 1 point
Clean compilation: 2 points
Runs correctly with sample data provided in *test_to_decimal.py*: 2 points
Runs correctly with instructor's test data set 1: 2 points
Runs correctly with instructor's test data set 2: 2 points

The penalty for late program submissions is 10% per day, with no program being accepted after 3 days.