Exercise 3: Part 1

Number Conversion

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UNSW, 2021

Introduction

This project will give you an opportunity to practice different number systems, algorithms on integers and ASCII code arithmetic.

The user will supply a base to convert from and an integer number which is read as a sequence of characters. If the given number is valid, then the program will prompt the user for a new base and the program will convert the number to that new base representation.

Programming Requirements

1. Your program will read the new number one character at a time. Each new character needs to be checked whether it is legal in the given base. You may assume that the digits '0', '1', …, '9' are followed by the digits 'A', 'B', 'C', …, 'Z'.

2. Your program will need to convert that number to a value in base 10. You may assume that the number entered is not larger than the largest possible integer value.

3. The program will display the digits of that integer value represented in the new base as a string of characters.

4. You must use proper ASCII arithmetic to convert from and to characters.

   Examples:

   source base = 2 source base = 16
   value = 1001 (9 in base 10) value = 1FA (4346 in base 10)
   target base = 10 target base = 8
   new representation = 9 new representation = 10372

   source base = 2 source base = 10
   value = 1001 (9 in base 10) value = 4346
   target base = 1 target base = 16
   new representation = 111111111 new representation = 1FA

Grading

Your program will be graded as follows:

Grading Point	Mark
Check validity of input	10
Character to decimal value conversion	30
Value to digit conversion in new base	30
Digit display	20
Code quality (e.g., variable names, formulation of selection statements and loops, etc)	10