Due Monday 01/30/2006 11:59 pm

1. Write a C program to print the base 2 (binary), base 7 and base 9 equivalent of a given positive decimal integer and its transpose.

Your program should

- Get a positive integer (say $X$) as input from the user
- Print the base 2 (binary), base 7 and base 9 equivalent of $X$
- Transpose the digits of $X$ to form another integer (say $Y$), such that the digits of $Y$ are in reverse order of how they appear in $X$
- Print the base 2 (binary), base 7 and base 9 equivalent of $Y$

Your code should have the following functions:

a. `void ChangeBase( int , int )`

The ChangeBase function takes in a positive decimal integer $X$, and the number system base $b$ as input, and prints the base $b$ equivalent of the number $X$. Your function should work for $b$ values ranging from 2-9.

Example:

i. $ChangeBase(100,7)$ should print

100 base 10 = 202 base 7

ii. $ChangeBase(100,9)$ should print

100 base 10 = 121 base 9

ii. $ChangeBase(100,2)$ should print

100 base 10 = 1100100 base 2

b. `int ReverseDigits( int )`

The ReverseDigits function takes a positive decimal integer $X$ as the input and returns the number formed by reversing the digits of $X$.

Example:

i. `int originalInteger = 5678;`  
   `int reversedInteger;`
   
   `reversedInteger = ReverseDigits(originalInteger);`

The value of reversedInteger after the function call should be 8765
ii. int originalInteger = 100;
   int reversedInteger;
   
   reversedInteger = ReverseDigits(originalInteger);
   
The value of \texttt{reversedInteger} after the function call should be 1
   
   When executed, your program should produce an output similar to …….
   
   Please enter the positive decimal integer : \texttt{100}
   
   100 base 10 = 121 base 9
   100 base 10 = 202 base 7
   100 base 10 = 1100100 base 2
   
The value of integer formed by reversing the digits of the input number, is : 1
   
   1 base 10 = 1 base 9
   1 base 10 = 1 base 7
   1 base 10 = 1 base 2
   
   2. Extra Credit
   
   Implement the \texttt{ChangeBase( )} function without using any looping constructs. This can be done by making \texttt{ChangeBase()} a recursive function.
   
   3. What to turn in
   
   Submission for these files will be similar to earlier assignments. You need to create a directory called \texttt{hw3/}. Put all the files listed above in that directory and run the \texttt{/ecelib/bin/turnin} command to submit your homework. You should turn in the following files:
   
   base_conversion.c
   base_conversion.txt
   base_conversion.script
   
   In case you do the extra credit
   
   recursive_base_conversion.c
   recursive_base_conversion.txt
   recursive_base_conversion.script
   
   4. References
   
   Number System : \url{http://www.free2code.net/plugins/articles/read.php?id=89}
   Recursion : \url{http://crasseux.com/books/ctutorial/Recursion.html#Recursion}