***Practical 1B: Introduction to C - Decimal to radix-n converter***

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**Practical Group:** Group 2

**Practical Venue:** Red Lab

**Date:** 20th March 2018

**Plagiarism Declaration**

1. I know that plagiarism is wrong. Plagiarism is to use another’s work and pretend that it is one’s own.

2. I have used the IEEE convention for citation and referencing. Each contribution to, and quotation in, this practical report from the work(s) of other people has been attributed and has been cited and referenced.

3. This practical report (including circuit diagrams and code) is my own work.

4. I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as their own work.

5. I acknowledge that copying someone else’s code, schematics or report, or part of it, is wrong, and declare that this is my own work.

20th March 2018

Signature Date

**// Question a**

#include <stdio.h>

#include <stdlib.h>

int main()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

printf("DECIMAL TO RADIX-n converter \n");

printf("Written by: RONAK MEHTA \n", name);

printf("Date: 2018 \n");

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

return 0;

}

**// Question b**

#include <stdio.h>

#include <stdlib.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR "2018"

int main()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

printf("%s \n", TITLE);

printf("Written by: %s \n", AUTHOR);

printf("Date: %s \n", YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

return 0;

}

**// Question c**

#include <stdio.h>

#include <stdlib.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR 2018

int main()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

printf("%s \n", TITLE);

printf("Written by: %s \n", AUTHOR);

printf("Date: %d \n", YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

int dec;

printf("Enter a decimal number: ");

scanf("%d",&dec);

printf("The number you have entered is %d \n",dec);

return 0;

}

**// Question d**

#include <stdio.h>

#include <stdlib.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR 2018

int main()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

printf("%s \n", TITLE);

printf("Written by: %s \n", AUTHOR);

printf("Date: %d \n", YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \n");

int dec;

printf("Enter a decimal number: ");

scanf("%d",&dec);

printf("The number you have entered is %d \n",dec);

int radix;

printf("Enter a radix for the converter between 2 and 16: ");

scanf("%d",&radix);

printf("The radix you have entered is %d ",radix);

return 0;

}

**// Question e**

#include <stdio.h>

#include <stdlib.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR 2018

int dec;

int radix;

int main ()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

printf("%s \n",TITLE);

printf("Written by: %s \n",AUTHOR);

printf("Date: %d \n",YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

while(1)

{

printf("Enter a decimal number: ");

scanf("%d", &dec);

if (dec < 0)

{

printf("EXIT\n");

break;

}

printf("The number you have entered is %d\n",dec);

printf("Enter a radix for the converter between 2 and 16: ");

scanf("%d", &radix);

printf("The radix you have entered is %d\n", radix);

}

return 0;

}

**// Question f**

#include <stdio.h>

#include <stdlib.h>

#include <math.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR 2018

int dec;

int radix;

double log\_value;

int main ()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

printf("%s \n",TITLE);

printf("Written by: %s \n",AUTHOR);

printf("Date: %d \n",YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

while(1)

{

printf("Enter a decimal number: ");

scanf("%d", &dec);

if (dec < 0)

{

printf("EXIT\n");

break;

}

printf("The number you have entered is %d\n",dec);

printf("Enter a radix for the converter between 2 and 16: ");

scanf("%d", &radix);

printf("The radix you have entered is %d\n", radix);

log\_value = log(dec)/log(2);

printf("The log2 of the number is %.2f\n", log\_value);

}

return 0;

}

**// Question g**

#include <stdio.h>

#include <stdlib.h>

#include <math.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR 2018

int dec;

int radix;

double log\_value;

int int\_result;

int main ()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

printf("%s \n",TITLE);

printf("Written by: %s \n",AUTHOR);

printf("Date: %d \n",YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

while(1)

{

printf("Enter a decimal number: ");

scanf("%d", &dec);

if (dec < 0)

{

printf("EXIT\n");

break;

}

printf("The number you have entered is %d\n",dec);

printf("Enter a radix for the converter between 2 and 16: ");

scanf("%d", &radix);

printf("The radix you have entered is %d\n", radix);

log\_value = log(dec)/log(2);

printf("The log2 of the number is %.2f\n", log\_value);

int\_result = dec / radix;

printf("The integer result of the number divided by %d is %d\n", radix, int\_result);

} return 0;

}

**// Question h**

#include <stdio.h>

#include <stdlib.h>

#include <math.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR 2018

int dec;

int radix;

double log\_value;

int remainder\_value;

int int\_result;

int main () {

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

printf("%s \n",TITLE);

printf("Written by: %s \n",AUTHOR);

printf("Date: %d \n",YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

while(1) {

printf("Enter a decimal number: ");

scanf("%d", &dec);

if (dec < 0){

printf("EXIT\n");

break;

}

printf("The number you have entered is %d\n",dec);

printf("Enter a radix for the converter between 2 and 16: ");

scanf("%d", &radix);

printf("The radix you have entered is %d\n", radix);

log\_value = log(dec)/log(2);

printf("The log2 of the number is %.2f\n", log\_value);

int\_result = dec / radix;

printf("The integer result of the number divided by %d is %d\n", radix, int\_result);

remainder\_value = dec % radix;

printf("The remainder is %d\n",remainder\_value);

} return 0;

}

**// Question i**

Pseudocode to Convert Integer Decimal number to radix-n value (n is a subset in {2,3,..,16}

* Include Math Library and Standard i/o
* Enter all the necessary variables
* Define the main function
* Ask user to input Decimal number
* Ask user to input radix for converter between 2 and 16 inclusive
* Find log 2 of decimal number using: log (decimal number) / log2. Give answer to two decimal points.
* Calculate the integer result of number divided by radix (Formula: = decimal/radix)
* Calculate the remainder (Formula: = decimal % radix)
* Find the total number of digits for the converter (Use the Ceil Function which rounds up the value)
* Pass the remainder to an array to store the value
* Have a for loop to repeat this procedure as long as the loop is less than the number of digits
* End of Program

**// Question j & k**

#include <stdio.h>

#include <stdlib.h>

#include <math.h>

# define TITLE "DECIMAL TO RADIX-n converter"

# define AUTHOR "Ronak Mehta"

# define YEAR 2018

//Global Variables

int dec;

int radix;

double log\_value;

int remainder\_value;

int int\_result;

int loop = 0;

int num\_of\_digits;

char\* Dec2RadixN(int decValue, int radValue); // Declaring the Function

int main ()

{

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

printf("%s \n",TITLE);

printf("Written by: %s \n",AUTHOR);

printf("Date: %d \n",YEAR);

printf("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\n");

while(1){ //When True; this code will be implemented

printf("Enter a decimal number: ");

scanf("%d", &dec);

if (dec < 0){

printf("EXIT\n");

break;

}

printf("The number you have entered is %d\n",dec);

printf("Enter a radix for the converter between 2 and 16: ");

scanf("%d", &radix);

printf("The radix you have entered is %d\n", radix);

log\_value = log(dec)/log(2);

printf("The log2 of the number is %.2f\n", log\_value);

int\_result = dec / radix;

printf("The integer result of the number divided by %d is %d\n", radix, int\_result);

remainder\_value = dec % radix;

printf("The remainder is %d\n",remainder\_value);

printf("The radix-%d value is ",radix);

num\_of\_digits = ceil((log(dec))/(log(radix)))+1; // Use of ceil to round up the value

for(loop = 0; loop < num\_of\_digits; loop++) { // Generates results until the limiting condition is met

printf("%c", Dec2RadixN(dec,radix)[loop]); // Call to the function

}

printf("\n");

}

return 0;

} // End of Main Function

char\* Dec2RadixN(int decValue, int radValue) // Function being defined

{

int n = num\_of\_digits;

char radix\_value[num\_of\_digits];

int\_result = decValue;

char digits[] = {'0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F'};

char\* solution;

while (n>0)

{

remainder\_value = int\_result%radValue;

int\_result = int\_result/radValue;

radix\_value[--n] = digits[remainder\_value];

}

solution = radix\_value;

return solution;

}

// End of Program