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

Name: Mehta, Ronak
Student No: MHTRON001
Practical Group: Group 2
Practical Venue: Red Lab
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Signature

20th March 2018

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
```