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COLLEGE OF ENGINEERING FOR WOMEN

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PROBLEM STATEMENT

Converting numbers from one base to another is a common question asked in the field of computers and electronics.
Subjects like digital electronics, discrete mathematics, etc.
Using C we can create an application to convert numbers from one base to another.
It requires basic knowledge of C like string, arithmetic operations, etc.

The functionality of the Number System Conversion is mentioned below:

Decimal to Binary
Binary to Decimal
Decimal to Octal
Octal to Decimal
Hexadecimal to Binary
Binary to Hexadecimal
Octal to Binary
Binary to Octal

```
#include<stdio.h>
```

```
#include<math.h>
#include<stdbool.h>
int binaryToDecimal(int n)
{ int decimal = 0;
	int b = 0;
	while (n!=0)
	{   int last_digit = n % 10;
		n = n / 10;
		decimal = decimal + last_digit * pow(2,b);
		b++;
	}
	printf("the decimal number is:%d\n",decimal);
}

int decToBinary(int n)
{ int binary[64];
	int i = 0;
	while (n > 0)
	{
		binary[i] = n % 2;
		n = n / 2;
		i++;
	}
	printf("the binary number is:\n");
	for (int j = i - 1; j >= 0; j--)
		printf("%d", binary[j]);
}

int dectooctal(int n)
{ int octn[100];
  int i = 0;
  while (n != 0)
  {
    octn[i] = n % 8;
    n = n / 8;
    i++;
  }
  printf("the octal number is:\n");
  for (int j = i - 1; j >= 0; j--)
	printf("%d", octn[j]);
}









int octod(int n)
```

```
{ int x = 0;
  int ans=0;
  while(n>0)
      { int y=n%10;
        n=n/10;
        ans+=y*pow(8,x);
        x++;
      }
 return ans;
}

int btoh(int n)
{ long int hexa = 0;
  int i=1,rem;
  while(n!=0)
  { rem = n%10;
       hexa = hexa + rem*i;
        i = i*2;
        n = n/10;
      }
 printf("the hexadecimal number is:%lx\n",hexa);
}

int htob(int n)
{  int ans=0,b[100],i=0;
  while(n!=0)
      {int dig = n%10;
       ans = ans+(dig*pow(16,i));
       n=n/10;
       i++;
      }
  int j=0,k;
  while(ans>0)
  { b[j]=ans%2;
       ans=ans>>1;
       j++;
      }
      printf("the binary number is:\n");
      for(k=j-1;k>=0;k--)
        {printf("%d",b[k]);}
         }

          long long int octob(int oct)
```

```
{ int dec=0,i=0;
  long long int bin=0;
  while(oct!=0)
       {dec+=(oct%10)*pow(8,i);
        i++;
        oct/=10;
       }
  i=1;
  while(dec!=0)
       {bin+=(dec%2)*i;
        dec/=2;
        i*=10;
       }
   return bin;
}

int btooct(long long int n)
{ int octa=0,dec=0,i=0;
  while(n!=0)
       {
                dec+=(n%10)*pow(2,i);
                i++;
                n/=10;
       }
  i =1;
  while(dec!=0)
  {  octa+=(dec%8)*i;
        dec/=8;
    i*=10;
  }
 return octa;
}

int main()
{ char res;
  bool choice = true;
   do
       {int r;
       printf("enter the number conversion required(1/2/3/4/5/6):\n");
       printf( "1.decimal to binary\n");
       printf( "2.binary to decimal\n");
       printf( "3.decimal to octal\n");
       printf( "4.octal to decimal\n");
       printf( "5.hexadecimal to binary\n");
       printf( "6.binary to hexadecimal\n");
       printf( "7.binary to octal\n");
       printf( "8.octal to binary\n");
```

```
   scanf("%d",&r);

if(r==1)
        { int q;
        printf("enter a decimal number:\n");
        scanf("%d",&q);
        decToBinary(q);
    }


   else if(r==2)
        {int p;
        printf("enter a binary number: \n");
        scanf("%d",&p);
        binaryToDecimal(p);
    }


   else if(r==3)
        {int dec;
        printf("enter a decimal number: \n");
        scanf("%d",&dec);
        dectooctal(dec);
   }


   else if(r==4)
        {int oct;
        printf("enter octal number: \n");
        scanf("%d",&oct);
        printf("the decimal number is:%d\n",octod(oct));
   }


   else if(r==6)
        {long int bin;
        printf("enter binary number:\n");
        scanf("%ld",&bin);
        btoh(bin);
        }


   else if(r==5)
    {int hex;
    printf("enter a hexadecimal number:\n");
    scanf("%d",&hex);
    htob(hex);
    }
```

```
 else if(r==8)
      {int octal;
      printf("enter an octal number:");
      scanf("%d",&octal);
      printf("the binary number is:%lld\n",octob(octal));
     }


else if(r==7)
     { long long int bi;
      printf("enter a binary number:\n");
      scanf("%lld",&bi);
      printf("the octal number is:%d\n",btooct(bi));}


     else
          {printf("enter a valid conversion \n");}
     printf("\n");
     printf("do you want to go again:y/n\n");
     scanf("%s",&res);
  if(res=='y')
          {choice=true;}

     else
          {choice=false;}
    }while(choice==true);

    return 0;

}
```

OUTPUTS

```
enter the number conversion required(1/2/3/4/5/6):
1.decimal to binary
2.binary to decimal
3.decimal to octal
4.octal to decimal
5.hexadecimal to binary
6.binary to hexadecimal
7.binary to octal
8.octal to binary
1
enter a decimal number:
15
the binary number is:
1111
do you want to go again:y/n
y
```

```
enter the number conversion required(1/2/3/4/5/6):
1.decimal to binary
2.binary to decimal
3.decimal to octal
4.octal to decimal
5.hexadecimal to binary
6.binary to hexadecimal
7.binary to octal
8.octal to binary
7
enter a binary number:
1111
the octal number is:17

do you want to go again:y/n
y
```

OUTPUTS

```
enter the number conversion required(1/2/3/4/5/6):
1.decimal to binary
2.binary to decimal
3.decimal to octal
4.octal to decimal
5.hexadecimal to binary
6.binary to hexadecimal
7.binary to octal
8.octal to binary
6
enter binary number:
1010
the hexadecimal number is:a

do you want to go again:y/n
y
enter the number conversion required(1/2/3/4/5/6):
1.decimal to binary
2.binary to decimal
3.decimal to octal
4.octal to decimal
5.hexadecimal to binary
6.binary to hexadecimal
7.binary to octal
8.octal to binary
3
enter a decimal number:
5
the octal number is:
5
do you want to go again:y/n
n
```