CSA5179- Cryptography and Network Security Manual Practical.

Ex.No : 1

To implement Caesar Cipher

Date : 01-08-2023

1. **To implement Caesar Cipher in C program :-**

Program :

```
#include<stdio.h>
#include<string.h>
#include<ctype.h>
int main(){
	int k=3;
	char input[1000],cipher[1000];
	printf("Enter input string:");
	scanf("%s",&input);
	printf("Encrytption is : ");
	for(int i=0;i<strlen(input);i++){
		if(islower(input[i])){
			cipher[i]=((input[i]-'a'+k)%26)+'a';
		}
		else{
			cipher[i]=((input[i]-'A'+k)%26)+'A';
		}
		printf("%c",cipher[i]);
	}
	printf("\nDecrytption is : ");
	for(int i=0;i<strlen(cipher);i++){
		if(islower(input[i])){
			input[i]=((cipher[i]-'a'-k)%26)+'a';
		}
		else{
			input[i]=((cipher[i]-'A'-k)%26)+'A';
		}
		printf("%c",input[i]);
	}

}
```

Output:

```
Enter the String : apple
Encryption is : dssoh
Decryption is : apple
```

Ex.No : 2 **To Implement Play fair cipher**

Date : 01-08-2023

2. **To implement play fair cipher in C programming**

Program :

```
#include<stdio.h>
int check(char table[5][5], char k) {
   int i, j;
   for (i = 0; i < 5; ++i)
      for (j = 0; j < 5; ++j) {
         if (table[i][j] == k)
            return 0;
      }
   return 1;
}

void main() {
   int i, j, key_len;
   char table[5][5];
   for (i = 0; i < 5; ++i)
      for (j = 0; j < 5; ++j)
         table[i][j] = '0';

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

   printf("Enter the length of the Key. ");
   scanf("%d", &key_len);

   char key[key_len];

   printf("Enter the Key. ");
   for (i = -1; i < key_len; ++i) {
      scanf("%c", &key[i]);
      if (key[i] == 'j')
         key[i] = 'i';
   }

   int flag;
   int count = 0;

   // inserting the key into the table
```

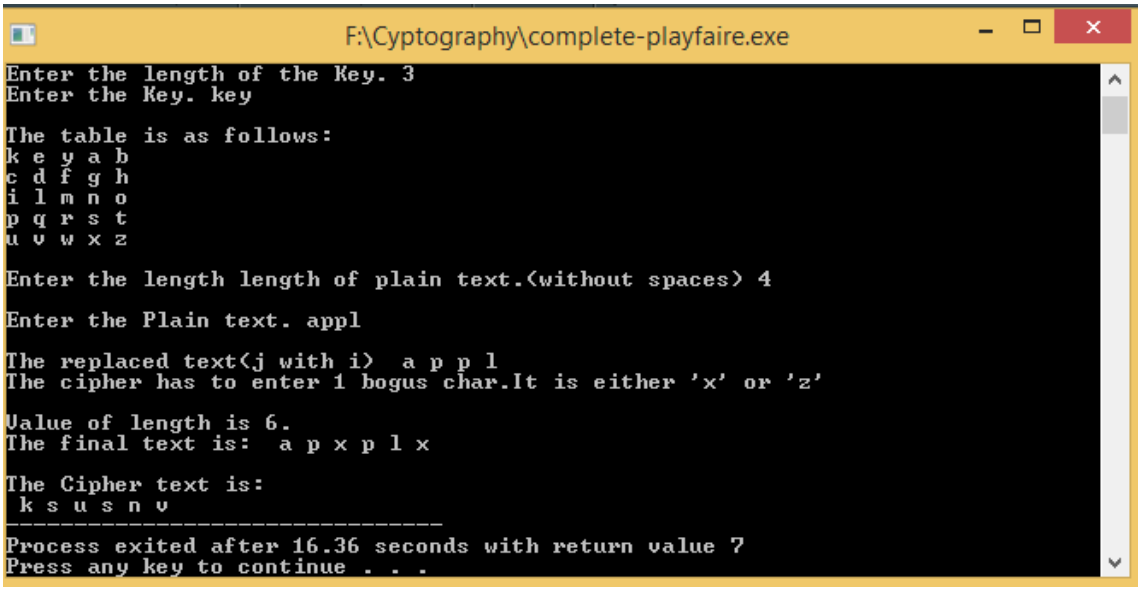
```
for (i = 0; i < 5; ++i) {
   for (j = 0; j < 5; ++j) {
      flag = 0;
      while (flag != 1) {
         if (count > key_len)
            goto l1;

         flag = check(table, key[count]);
         ++count;
      }// end of while
      table[i][j] = key[(count - 1)];
   }// end of inner for
}// end of outer for


l1: printf("\n");

int val = 97;
//inserting other alphabets
for (i = 0; i < 5; ++i) {
   for (j = 0; j < 5; ++j) {
      if (table[i][j] >= 97 && table[i][j] <= 123) {
      } else {
         flag = 0;
         while (flag != 1) {
            if ('j' == (char) val)
               ++val;
            flag = check(table, (char) val);
            ++val;
         }// end of while
         table[i][j] = (char) (val - 1);
      }//end of else
   }// end of inner for
}// end of outer for

printf("The table is as follows:\n");
for (i = 0; i < 5; ++i) {
   for (j = 0; j < 5; ++j) {
      printf("%c ", table[i][j]);
   }
   printf("\n");
}

int l = 0;
printf("\nEnter the length length of plain text.(without spaces) ");
scanf("%d", &l);
```

```
printf("\nEnter the Plain text. ");
char p[l];
for (i = -1; i < l; ++i) {
   scanf("%c", &p[i]);
}

for (i = -1; i < l; ++i) {
   if (p[i] == 'j')
      p[i] = 'i';
}

printf("\nThe replaced text(j with i)");
for (i = -1; i < l; ++i)
   printf("%c ", p[i]);

count = 0;
for (i = -1; i < l; ++i) {
   if (p[i] == p[i + 1])
      count = count + 1;
}

printf("\nThe cipher has to enter %d bogus char.It is either 'x' or 'z'\n",
      count);

int length = 0;
if ((l + count) % 2 != 0)
   length = (l + count + 1);
else
   length = (l + count);

printf("\nValue of length is %d.\n", length);
char p1[length];

//inserting bogus characters.
char temp1;
int count1 = 0;
for (i = -1; i < l; ++i) {
   p1[count1] = p[i];
   if (p[i] == p[i + 1]) {
      count1 = count1 + 1;
      if (p[i] == 'x')
         p1[count1] = 'z';
      else
         p1[count1] = 'x';
   }
```

```
    count1 = count1 + 1;
}

//checking for length

char bogus;
if ((l + count) % 2 != 0) {
    if (p1[length - 1] == 'x')
        p1[length] = 'z';
    else
        p1[length] = 'x';
}

printf("The final text is:");
for (i = 0; i <= length; ++i)
    printf("%c ", p1[i]);

char cipher_text[length];
int r1, r2, c1, c2;
int k1;

for (k1 = 1; k1 <= length; ++k1) {
    for (i = 0; i < 5; ++i) {
        for (j = 0; j < 5; ++j) {
            if (table[i][j] == p1[k1]) {
                r1 = i;
                c1 = j;
            } else if (table[i][j] == p1[k1 + 1]) {
                r2 = i;
                c2 = j;
            }
        }
    }

    if (r1 == r2) {
        cipher_text[k1] = table[r1][(c1 + 1) % 5];
        cipher_text[k1 + 1] = table[r1][(c2 + 1) % 5];
    }

    else if (c1 == c2) {
        cipher_text[k1] = table[(r1 + 1) % 5][c1];
        cipher_text[k1 + 1] = table[(r2 + 1) % 5][c1];
    } else {
        cipher_text[k1] = table[r1][c2];
        cipher_text[k1 + 1] = table[r2][c1];
    }
```

```
        k1 = k1 + 1;
    }//end of for with k1

    printf("\n\nThe Cipher text is:\n ");
    for (i = 1; i <= length; ++i)
        printf("%c ", cipher_text[i]);

}
```

Output:



Ex.no : 3 **To implement mono-alphabetic cipher**

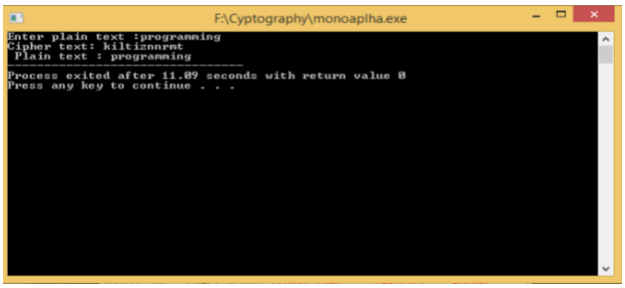
Date : 02-08-2023

3. **To implement monoalphabetic cipher in C programming**

Program:

```
#include<stdio.h>
int main(){
        char
alpha[100]="abcdefghijklmnopqrstuvwxyz",key[100]="zyxwvutsrqponmlkjihgfedcba",plain[100],ciph
er[100];
        int m=0,index[100];
        printf("Enter plain text :");
        scanf("%s",&plain);
        for(int i=0;i<strlen(plain);i++){
                for(int j=0;j<strlen(alpha);j++){
                        if(plain[i]==alpha[j]){
                                index[m]=j;
                                m++;
                        }
                }
        }
        printf("Cipher text: ");
        for(int i=0;i<strlen(plain);i++){
                cipher[i]=key[index[i]];
                printf("%c",cipher[i]);
        }
        printf("\n Plain text : ");
        for(int i=0;i<strlen(plain);i++){
                plain[i]=alpha[index[i]];
                printf("%c",plain[i]);
        }

}
```

Output:



Ex.no : 4

To implement Hill cipher

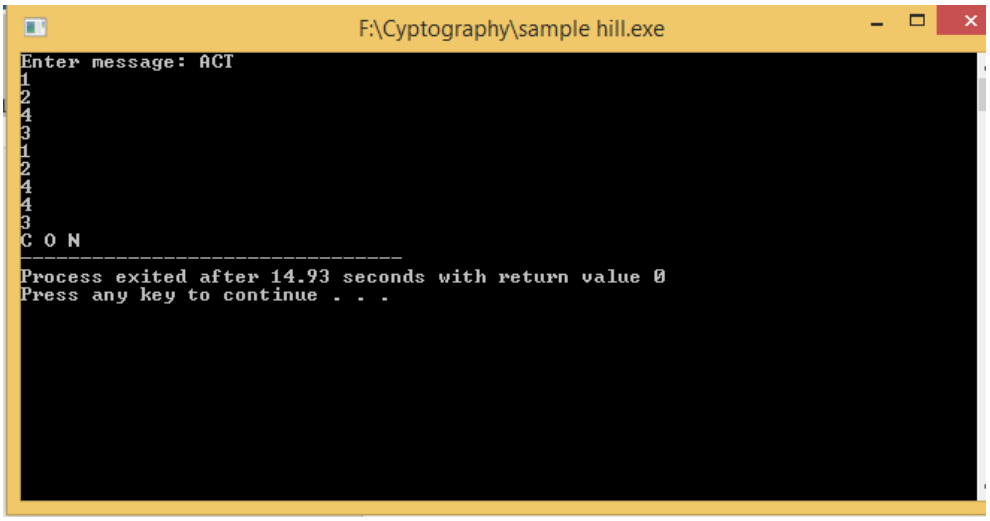
Date : 02-08-2023

4. **To implement hill cipher in C programming.**

Program:

```
#include<stdio.h>
#include<string.h>
int en[100][100],m[100][100],msg[100];
char ms[100];
void getkeymatrix(){
        printf("Enter message: ");
        scanf("%s",&ms);
        for(int i=0;i<strlen(ms);i++){
                msg[i]=ms[i]-65;
        }
        for(int i=0;i<strlen(ms);i++){
                for(int j=0;j<strlen(ms);j++){
                        scanf("%d",&m[i][j]);
                }
        }
}
void encryption(){
        int i, j, k,n,o;
        for(i = 0,n=0; i < strlen(ms); i++,n++)
        for(j = 0; j < strlen(ms); j++)
        for(k = 0,o=0; k < strlen(ms); k++,o++)
                en[i][j] = en[i][j] + m[n][k] * msg[k];
        for(i = 0; i < strlen(ms); i++){
                printf("%c ",(en[i][0]%26)+65);
        }
}

int main(){
        getkeymatrix();
        encryption();
}
```

Output :


F:\Cyptography\sample hill.exe
Enter message: ACT
1
2
4
3
1
2
4
4
3
C O N

Process exited after 14.93 seconds with return value 0
Press any key to continue . . .

Ex. No:5 **To Implement RailFence Algorithm**

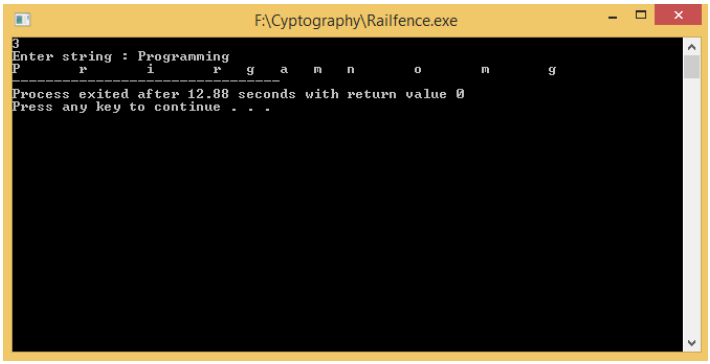
Date: 02-08-2023

5. **To Implement Railfence cipher in C programming .**

Program :

```
#include<stdio.h>
int main(){
        int count=0,len=0,rail=0,j=0;
        char str[100],code[100][100];
        scanf("%d",&rail);
        printf("Enter string : ");
        scanf("%s",&str);
        len=strlen(str);
        while(j<len){
                if(count%2==0){
                        for(int i=0;i<rail;i++){
                                code[i][j]=str[j];
                                j++;
                        }
                }
                else{
                        for(int i=rail-2;i>0;i--){
                                code[i][j]=str[j];
                                j++;
                        }
                }
                count++;
        }
        for(int i=0;i<rail;i++){
                for(int j=0;j<len;j++){
                        printf("%c ",code[i][j]);
                }
        }
}
```

Output:



Ex. No: 6 **To implement Columnar Cipher**

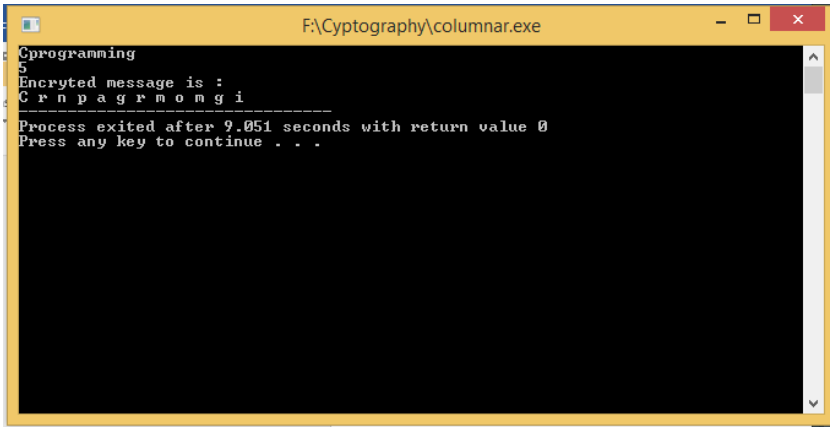
Date: 02-08-3-2023

6. **To implement Columnar cipher in C programming**

Program:

```
#include<stdio.h>
#include<string.h>
void encrypt(char message[],int key){
	int len=strlen(message),row=(len+key-1)/key,m=0;
	char encry[100][100];
	int index=0;
	for(int i=0;i<row;i++){
		for(int j=0;j<key;j++){
			if(m<len){
				encry[i][j]=message[m];
				m++;
			}
			else{
				encry[i][j]='X';
			}

		}
	}
	for(int j=0;j<key;j++){
		for(int i=0;i<row;i++){
			if(encry[i][j]!='X')
				printf("%c ",encry[i][j]);
		}
	}
}
int main(){
	char message[100];
	int key;
	scanf("%s",&message);
	scanf("%d",&key);
	printf("Encryted message is :\n");
	encrypt(message,key);
}
```

Output:


F:\Cyptography\columnar.exe
Cprogramming
5
Encryted message is :
C r n p a g r m o m g i

Process exited after 9.051 seconds with return value 0
Press any key to continue . . .

Ex.no:7 **To implement RSA Algorithm**

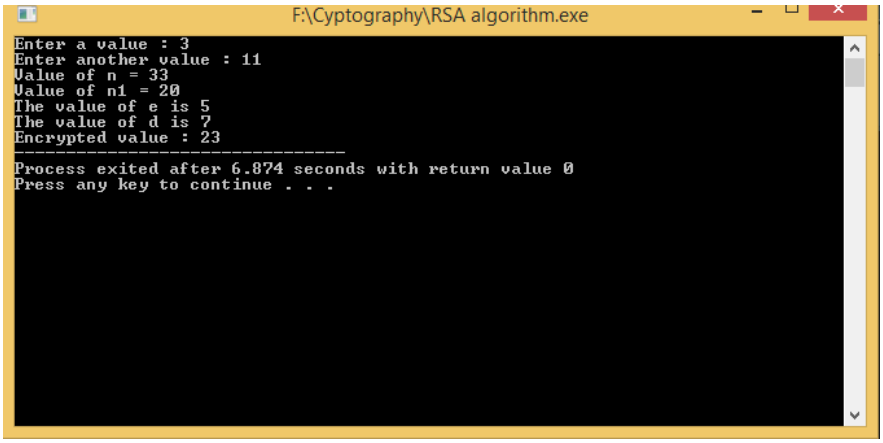
Date:

7. **To implement RSA algorithm in c program.**

Program:

```
#include<stdio.h>
#include<conio.h>
int main(){
        int c,p,q,n,n1,i,j,m=5,result=0,d[1000],result2=0,temp;
        printf("Enter a value : ");
        scanf("%d",&p);
        printf("Enter another value : ");
        scanf("%d",&q);
        n=p*q;
        printf("Value of n = %d\n",n);
        n1=(p-1)*(q-1);
        printf("Value of n1 = %d\n",n1);
        int e[10]={3,5,7,11,13,17};
        for(i=0;i<e[i];i++){
                if(n1%n1==0&&n1%e[i]==0){
                        result=e[i];
                        break;
                }
        }
        printf("The value of e is %d\n",result);
        for(i=0;i<e[i] && result2!=1;i++){
        for(j=1;j<1000;j++){
                result2=(j*e[i])%n1;
                if(result2==1){
                        break;
                }
        }
        printf("The value of d is %d\n",j);
        }
        temp=(pow(m,result));
        c=temp%n;
        printf("Encrypted value : %d",c);
}
```

Output:


F:\Cyptography\RSA algorithm.exe
Enter a value : 3
Enter another value : 11
Value of n = 33
Value of n1 = 20
The value of e is 5
The value of d is 7
Encrypted value : 23

Process exited after 6.874 seconds with return value 0
Press any key to continue . . .

Ex.no:8 **To implement Diffe-hellman algorithm**

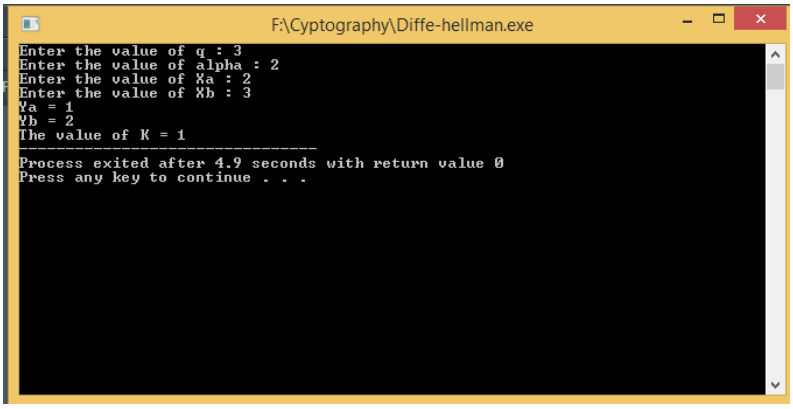
Date: 04-08-2023

8. **To implement Diffe-hellman algorithm in c program.**

Program

```
#include<stdio.h>
#include<conio.h>
#include<math.h>
int main(){
        int q,b,Xa,Xb,Ya,Yb,K1,K2,temp1,temp2,temp3,temp4;
        printf("Enter the value of q : ");
        scanf("%d",&q);
        printf("Enter the value of alpha : ");
        scanf("%d",&b);
        printf("Enter the value of Xa : ");
        scanf("%d",&Xa);
        printf("Enter the value of Xb : ");
        scanf("%d",&Xb);
        temp1=(pow(b,Xa));
        Ya=temp1%q;
        printf("Ya = %d\n",Ya);
        temp2=(pow(b,Xb));
        Yb=temp2%q;
        printf("Yb = %d\n",Yb);
        temp3=(pow(Yb,Xa));
        K1=temp3%q;
        temp4=(pow(Ya,Xb));
        K2=temp4%q;
        if(K1==K2){
                printf("The value of K = %d",K1);
        }
        return 0;
}
```

Output:



Ex.no:9 **To implement DES algorithm**

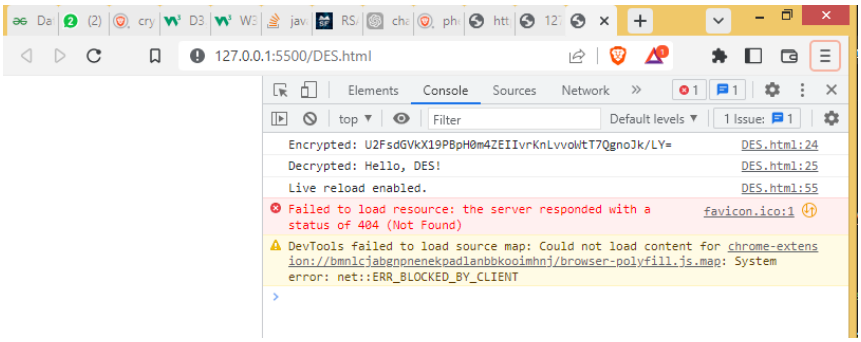
Date:04-08-2023

9. To implement DES algorithm

Program:

```
<!DOCTYPE html>
<html>
<head>
  <title>DES Encryption and Decryption</title>
  <script src="https://cdnjs.cloudflare.com/ajax/libs/crypto-js/4.1.1/crypto-js.min.js"></script>
</head>
<body>
  <script>
    // DES encryption using crypto-js library in a browser
    function desEncrypt(input, key) {
      const encryptedData = CryptoJS.DES.encrypt(input, key).toString();
      return encryptedData;
    }

    // DES decryption using crypto-js library in a browser
    function desDecrypt(input, key) {
      const decryptedData = CryptoJS.DES.decrypt(input, key).toString(CryptoJS.enc.Utf8);
      return decryptedData;
    }

    const plaintext = 'Hello, DES!';
    const key = 'ThisIs64BitKey';
    const encryptedText = desEncrypt(plaintext, key);
    console.log('Encrypted:', encryptedText);
    console.log('Decrypted:', desDecrypt(encryptedText, key));
  </script>
</body>
</html>
```

Output:



Ex.no: 10 **To implement SHA algorithm**

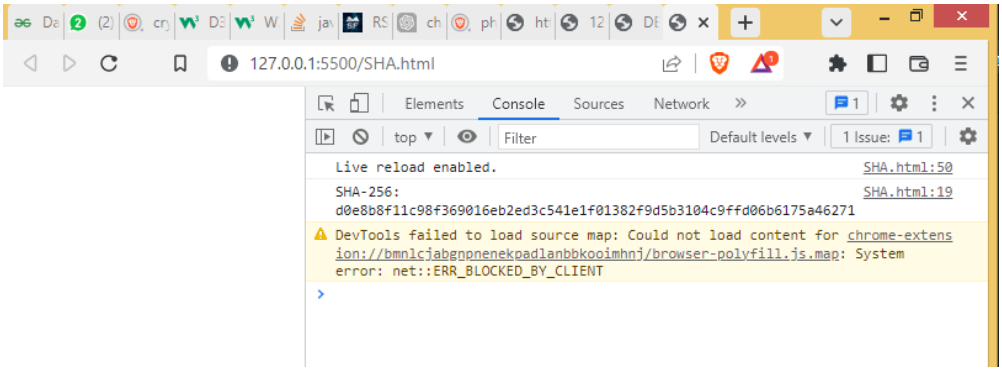
Date:05-04-2023

10. To implement SHA algorithm

Program:

```
<!DOCTYPE html>
<html>
<head>
 <title>SHA-256 Hashing</title>
</head>
<body>
 <script>
  async function sha256(input) {
   const encoder = new TextEncoder();
   const data = encoder.encode(input);
   const hashBuffer = await crypto.subtle.digest('SHA-256', data);
   const hashArray = Array.from(new Uint8Array(hashBuffer));
   const hashHex = hashArray.map(byte => byte.toString(16).padStart(2, '0')).join('');
   return hashHex;
  }

  const data = 'Hello, SHA-256!';
  sha256(data).then(hashValue => {
   console.log('SHA-256:', hashValue);
  });
 </script>
</body>
</html>
```

Output:



Ex.no: 11 **To implement MD5 algorithm**

Date:05-04-2023

1. **To implement MD5 algorithm**

Program:

```
<!DOCTYPE html>
<html>
<head>
  <title>SHA-256 Hashing</title>
</head>
<body>
  <script>
    async function MD5(input) {
      const encoder = new TextEncoder();
      const data = encoder.encode(input);
      const hashBuffer = await crypto.subtle.digest('SHA-256', data);
      const hashArray = Array.from(new Uint8Array(hashBuffer));
      const hashHex = hashArray.map(byte => byte.toString(16).padStart(2, '0')).join('');
      return hashHex;
    }

    const data = 'Hello, SHA-256!';
    MD5(data).then(hashValue => {
      console.log('SHA-256:', hashValue);
    });
  </script>
</body>
</html>
```

Output: