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| **Experiment No.** | 4 |

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|  | Program |
| **AIM:** | To obtain Discrete Fourier Transform (DFT) of the given L point sequence x[n] using C language |
| **Objective:** | To obtain Discrete Fourier Transform (DFT) of the given L point sequence x[n] using C language |
| **Software used:** | Compiler: GCC 10.4  Language: C++ 20 |
| **Code:** | #include <stdio.h>  #include <math.h>  int main()  {  printf("Discrete Fourier Transform\n");  int length = 0;  printf("\nEnter the length of x[n]: ");  scanf("%d",&length); //length of x[n]  int x[length];  printf("\nEnter the values of x[%d]: ",length);  for(int i = 0; i < length; i++){  scanf("%d",&x[i]); //values of x[n]  }  float xr[length]; //real part of X[K]  float xj[length]; //imaginary part of X[K]  for(int i = 0; i < length; i++)  {  xr[i] = 0;  xj[i] = 0;  }  float w = (float)(-6.283/length); // w = -2\*pi/N  float temp = 0;  for(int i = 0; i < length; i++)  {  for(int j = 0; j < length; j++)  {  temp = w\*i\*j;  xr[i] += x[j] \* cos(temp);  // X[K] is addition of [x(n)\*e^(-o)] with 'n' varying from n=0 to n=length-1 xj[i] += x[j] \* sin(temp);  }  }    printf("\nValues of X[K] are: "); //print X[K]  for(int i = 0; i < length; i++)  {  if(xr[i] >= 0 && xj[i] >= 0)  printf("\n +%04.2f +%04.2fj k = %d",xr[i],xj[i],i); else if(xr[i] >= 0 && xj[i] < 0)  printf("\n +%04.2f %04.2fj k = %d",xr[i],xj[i],i); else if(xr[i] < 0 && xj[i] >= 0)  printf("\n %04.2f +%04.2fj k = %d",xr[i],xj[i],i); else  printf("\n %04.2f %04.2fj k = %d",xr[i],xj[i],i);  }  printf("\n");  } |
| **Output** |  |
| **Conclusion**  Through this experiment aimed obtained the Discrete Fourier Transform (DFT) of a given L point sequence x[n] using the C language. The experiment was successful in achieving its goal and provided insights into the process of performing DFT calculations using C. | |