MATRIX MANIPULATION

Exercises:

1)

```
int m1[][3]={{1, 2, 3}, {2, 3, 4}, {3, 4, 5}};
int m2[][3]={{1, 2, 3}, {2, 3, 4}, {3, 4, 5}}, i, j;
for(i=0; i<3; i++)
{
    for(j=0; j<3; j++)
            printf("%d ", m1[i][j]+m2[i][j]);
    printf("\n");
}
```

2)

```
int a[][3]={{1, 2, 3}, {4, 5, 6}, {7, 8, 9}}, b[3][3], i, j;
printf("Entered matrix  : \n");
for(i=0; i<3; i++)
{
    for(j=0; j<3; j++)
            printf("%d ", a[i][j]);
    printf("\n");
}
for(i=0; i<3; i++)
    for(j=0; j<3; j++)
            b[j][i]=a[i][j];
printf("Transpose of matrix : \n");
for(i=0; i<3; i++)
{
    for(j=0; j<3; j++)
        printf("%d ", b[i][j]);
    printf("\n");
}
```

3)

```
int a[][3]={{1, 2, 3}, {14, 5, 16}, {7, 8, 9}}, i, j, l, r, c;
l=a[0][0];
printf("Entered matrix  : \n");
for(i=0; i<3; i++)
{
    for(j=0; j<3; j++)
    {
        printf("%d ", a[i][j]);
        if(a[i][j]>l)
        {
            l=a[i][j];
            r=i+1;
            c=j+1;
        }
    }
    printf("\n");
}
printf("Largest element is : %d\n", l);
printf("Row = %d\n", r);
printf("Column = %d", c);
```

4)

```
int a[][3]={{1, 2, 3}, {4, 5, 6}, {7, 8, 9}}, i, j, c;
printf("Entered matrix  : \n");
for(i=0; i<3; i++)
```

```
        {
            for(j=0; j<3; j++)
                    printf("%d ", a[i][j]);
            printf("\n");
        }
        for(i=0; i<3; i++)
        {
            c=a[0][i];
            a[0][i]=a[2][i];
            a[2][i]=c;
        }
        printf("After interchanging row 1 with row 3\n");
        for(i=0; i<3; i++)
        {
            for(j=0; j<3; j++)
                    printf("%d ", a[i][j]);
            printf("\n");
        }


5)      int a[3][4], i, j, s;
        printf("Input elements of a 2x3 matrix row wise : ");
        for(i=0; i<2; i++)
            for(j=0; j<3; j++)
                    scanf("%d", &a[i][j]);

        printf("\nEntered matrix\n");
        for(i=0; i<2; i++)
        {
            for(j=0; j<3; j++)
                    printf("%d ", a[i][j]);
```

```
          printf("\n");
      }
      for(i=0; i<2; i++)
      {
          s=0;
          for(j=0; j<3; j++)
                  s+=a[i][j];
          a[i][j]=s;
      }

      for(i=0; i<=3; i++)
      {
          s=0;
          for(j=0; j<2; j++)
                  s+=a[j][i];
          a[j][i]=s;
      }

      printf("\nModified matrix\n");
      for(i=0; i<3; i++)
      {
          for(j=0; j<4; j++)
                  printf("%d ", a[i][j]);
          printf("\n");
      }


6)    int a[3][3], i, j, c=0;
      printf("Input elements of a 3x3 matrix row wise : ");
      for(i=0; i<3; i++)
          for(j=0; j<3; j++)
```

```
                  scanf("%d", &a[i][j]);

        printf("\nEntered matrix\n");
        for(i=0; i<3; i++)
        {
            for(j=0; j<3; j++)
            {
                  printf("%d ", a[i][j]);
                  if(a[i][j]==0)
                        c++;
            }
            printf("\n");
        }
        if(c>(3*3)/2)
            printf("Sparse matrix!");
        else
            printf("Not a sparse matrix!");


7)      int a[4][4], i, j, c=0;
        for(i=0; i<4; i++)
        {
            for(j=0; j<4; j++)
            {
                  if(i==j)
                        a[i][j]=1;
                  else
                        a[i][j]=0;
                  printf("%d ", a[i][j]);
            }
            printf("\n");
        }


8)      int a[3][3]={{1, 2, 3}, {4, 5, 6}, {7, 8, 9}}, i, j, c=0;
        printf("Elements of matrix are : \n");
        for(i=0; i<3; i++)
        {
            for(j=0; j<3; j++)
                    printf("%d ", a[i][j]);
            printf("\n");
        }
        printf("Left diagonal elements : ");
        for(i=0; i<3; i++)
        {
            for(j=0; j<3; j++)
                    if(i==j)
                            printf("%d ", a[i][j]);
        }
        printf("\nRight diagonal elements : ");
        for(i=0, j=2; i<3; i++, j--)
            printf("%d ", a[i][j]);


9)          int a[4][5]={{1, 2, 3, 4}, {2, 3, 4, 1}, {3, 4, 1, 2}, {4, 1, 2, 3}};
            int i, j, ind, n;
            printf("Elements of matrix are : \n");
            for(i=0; i<4; i++)
            {
                    for(j=0; j<4; j++)
                            printf("%d ", a[i][j]);
                    printf("\n");
```

```
}

printf("Enter a number : ");
scanf("%d", &n);

for(i=0; i<4; i++)
        if(a[0][i]==n)
        {
                ind=i;
                break;
        }
for(i=0; i<4; i++)
{
        for(j=3; j>ind; j--)
                a[i][j+1]=a[i][j];
        a[i][j+1]=i+1;
}

printf("New matrix is : \n");
for(i=0; i<4; i++)
{
        for(j=0; j<5; j++)
                printf("%d ", a[i][j]);
        printf("\n");
}
```

Aptitude Questions:

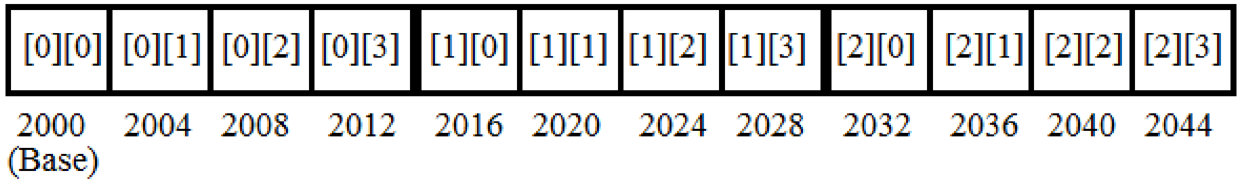
1) 1 2 3
   4 5 0

2) Error! Expected expression before ‘,’ token

3) 0

4) Theoretically there are no limits upon the number of dimensions.

5) 2040, The row-wise memory mapping has been shown in the figure below



[0][0]	[0][1]	[0][2]	[0][3]	[1][0]	[1][1]	[1][2]	[1][3]	[2][0]	[2][1]	[2][2]	[2][3]
2000 (Base)	2004	2008	2012	2016	2020	2024	2028	2032	2036	2040	2044