IAT-1 scheme & solution

Descriptive: 2Q*5M=10M

Multiple Choice: 20Q*2M=40M

Total Marks = 50M

Each question carries 5 Marks (5*2=10M)

1. Write a function to find transpose of a sparse matrix
   Sol:

   Function:

```
void transpose(int b1[][3],int b2[][3])
{
        int i,j,k,n;
        b2[0][0]=b1[0][1];
        b2[0][1]=b1[0][0];
        b2[0][2]=b1[0][2];

        k=1;
        n=b1[0][2];

        for(i=0;i<b1[0][1];i++)
                for(j=1;j<=n;j++)
                        //if a column number of current triple==i then insert the current triple
in b2
                        if(i==b1[j][1])
                        {
                                b2[k][0]=i;
                                b2[k][1]=b1[j][0];
                                b2[k][2]=b1[j][2];
                                k++;
                        }
}
```

Program:

```
#include<stdio.h>

#define MAX 20

void printsparse(int[][3]);
void readsparse(int[][3]);
void transpose(int[][3],int[][3]);

int main()
{
	int b1[MAX][3],b2[MAX][3],m,n;
	printf("Enter the size of matrix (rows,columns):");

	scanf("%d%d",&m,&n);
	b1[0][0]=m;
	b1[0][1]=n;

	readsparse(b1);
	transpose(b1,b2);
	printsparse(b2);
}

void readsparse(int b[MAX][3])
{
	int i,t;
	printf("\nEnter no. of non-zero elements:");
	scanf("%d",&t);
	b[0][2]=t;

	for(i=1;i<=t;i++)
	{
		printf("\nEnter the next triple(row,column,value):");
		scanf("%d%d%d",&b[i][0],&b[i][1],&b[i][2]);
	}
}

void printsparse(int b[MAX][3])
{
	int i,n;
	n=b[0][2];	//no of 3-triples

	printf("\nAfter Transpose:\n");

	printf("\nrow\t\tcolumn\t\tvalue\n");
```

```
	for(i=0;i<=n;i++)
		printf("%d\t\t%d\t\t%d\n",b[i][0],b[i][1],b[i][2]);
}

void transpose(int b1[][3],int b2[][3])
{
	int i,j,k,n;
	b2[0][0]=b1[0][1];
	b2[0][1]=b1[0][0];
	b2[0][2]=b1[0][2];

	k=1;
	n=b1[0][2];

	for(i=0;i<b1[0][1];i++)
		for(j=1;j<=n;j++)
			//if a column number of current triple==i then insert the current triple
in b2
			if(i==b1[j][1])
			{
				b2[k][0]=i;
				b2[k][1]=b1[j][0];
				b2[k][2]=b1[j][2];
				k++;
			}
}
```

2. Write a program to sort the given strings using bubble sort algorithm.
   Sol:

```
#include <stdio.h>
#include <string.h>
void main()
{
  char name[25][50],temp[25];
  int n,i,j;

     printf("\n\nSorts the strings of an array using bubble sort :\n");
     printf("-----------------------------------------------------\n");


  printf("Input number of strings :");
  scanf("%d",&n);

printf("Input string %d :\n",n);
  for(i=0;i<=n;i++)
  {
```

```
    fgets(name[i], sizeof name, stdin);
}
  /*Logic Bubble Sort*/

  for(i=1;i<=n;i++)
        for(j=0;j<=n-i;j++)
          if(strcmp(name[j],name[j+1])>0)
          {
        strcpy(temp,name[j]);
           strcpy(name[j],name[j+1]);
           strcpy(name[j+1],temp);
          }
 printf("The strings appears after sorting :\n");
             for(i=0;i<=n;i++)
                   printf("%s\n",name[i]);

        }
```

Each question carries 2 Marks (20*2=40M)

1. Array are examples of _____.
   a. Linear data structure
   b. Non-linear data structure
   c. Primitive data type
   d. None of the above
2. Which of the following is a non-linear data structure?
   a. Array
   b. Linked list
   c. Stack
   d. Graph
3. Which of the following involves arranging the records in a logical order?
   a. Merging
   b. Sorting
   c. Traversing
   d. Searching
4. Which of the following is a set of data values and associated operations that are specified accurately, independent of any particular implementation?
   a. Stack
   b. Array
   c. Abstract data type
   d. List

5. Which is the logical or mathematical model of a particular organization of a data?
   a. Structures
   b. Variable

c. Data structures
d. Function

6. Which of the following is not a primitive data structure?
   a. Boolean
   b. Integer
   c. Array
   d. Character
7. Which of the following are themselves a collection of different data types?
   a. String
   b. Structures
   c. Char
   d. All of the above
8. User-defined data type can be derived by _____.
   a. Struct
   b. Union
   c. Typedef
   d. All of the above
9. Which operator connects the structure name to its member name?
   a. ->
   b. .
   c. <-
   d. Both . and ->
10. Which of the following cannot be a structure member?
    a. Function
    b. Array
    c. Pointer
    d. Another structure
11. Which of the following operation is illegal in structures?
    a. Typecasting of structure
    b. Pointer to a variable of same structure
    c. Dynamic allocation of memory for a structure
    d. All of the above
12. Which of the following header files must necessarily be included to use dynamic memory allocation functions?
    a. stdlib.h
    b. stdio.h
    c. memory.h
    d. dos.h

13. Which function will you choose to join two words?
    a. strcpy()
    b. strcat()
    c. strncon()
    d. memcon()

14. What will strcmp() function do?
    a. compares the first n characters of the object
    b. compares the string
    c. undefined function
    d. copies the string

15. What is the return type of malloc() or calloc()?

    a. int *
    b. int **
    c. void *
    d. void **

16. Which function is used to delete the allocated memory space?

    a. dealloc()
    b. free()
    c. Both a and b
    d. either a or b

17. What is the output of this C code?

```
int main()
{
int i = 45;
int *p = &i;
printf("%f\n", *(float*)p);
return 0;
}
```

    a. Compile time error
    b. Garbage value
    c. 0.000000
    d. 45

18. Given the base address of an array A[90…..1200] as 1120 and size of each element is 2 bytes in the memory. Find the address of A [400]. The given values are: B = 1120, LB = 90, W = 2, I = 400
    a. 1740
    b. 1530
    c. 1230
    d. 1896

19. A sparse matrix can be represented in _____
    a. Tree
    b. Graph
    c. Triplet
    d. None of the above

20.
```
struct {
short s[5];
union {
  float y;
```

```
    long z;
  }u;
} t;
```

Assume that objects of the type int and float occupies 4 bytes respectively. The memory requirement for variable t, is

a. 10 bytes
b. 18 bytes
c. 22 bytes
d. 14 bytes