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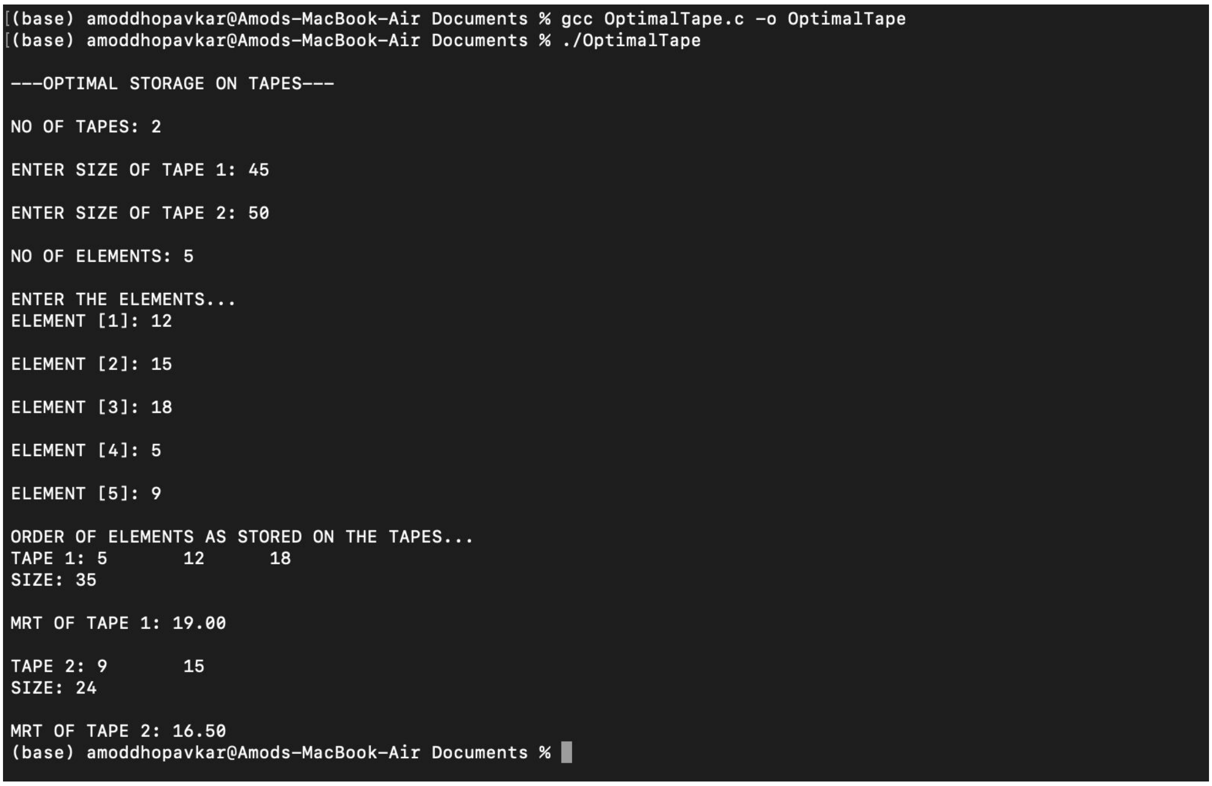
Optimal Storage on Tapes
*/

Code →

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

void sort(int *a, int n) {                                      //Sorting function
    int i, j;
    for(i=0; i<n-1; i++) {
        for(j=i+1; j<n; j++) {
            if(a[i] > a[j]) {
                int temp=a[i];
                a[i] = a[j];
                a[j] = temp;
            }
        }
    }
}

float calculate(int tape[], int n) {                            //For calculating MRT
    int sum = 0, k = n, i;
    for(i=0;i<n;i++) {
        sum = sum + tape[i]*k;
        k--;
    }
    return ((float)sum / (float)n);
}

void MRT(int *a, int n, int cap[], int ntapes, int flag[]) {          //Placing elements in tape
    int *size, i, j, *count;
    size = (int *)malloc(ntapes * sizeof(int));
    count = (int *)malloc(ntapes * sizeof(int));
    for(i=0; i<ntapes; i++)
        count[i] = 0;

    int **tape=(int **)malloc(ntapes * sizeof(int*));
    for(i=0; i<n; i++)
        tape[i] = (int *)malloc(n * sizeof(int));
    int currtape = -1;

    for(i=0; i<n; i++) {
```

```
		for(j=currtape+1; j<ntapes; j++) {
			if(size[j]+a[i] <= cap[j] && flag[i] == 0) {
				tape[j][count[j]++] = a[i];
				size[j] += a[i];
				flag[i] = 1;
				currtape = j;
				if(currtape == ntapes - 1)
					currtape = -1;
			}
		}
	}

	printf("\nORDER OF ELEMENTS AS STORED ON THE TAPES...");
	for(i=0; i<ntapes; i++) {
		printf("\nTAPE %d: ",i+1);

		for(j=0; j<count[i]; j++) {
			printf("%d\t",tape[i][j]);
		}
		printf("\nSIZE: %d\n",size[i]);
		float mean = calculate(tape[i],count[i]);
		printf("\nMRT OF TAPE %d: %.2f\n",i+1,mean);
	}
}

int main() {						//main function
	int n, *arr, *cap, ntapes, *flag;
	printf("\n---OPTIMAL STORAGE ON TAPES---\n");
	printf("\nNO OF TAPES: ");
	scanf("%d",&ntapes);
	cap = (int*)malloc(ntapes * sizeof(int));

	int i;
	for(i=0;i<ntapes;i++) {
		printf("\nENTER SIZE OF TAPE %d: ",i+1);
		scanf("%d",&cap[i]);
	}

	printf("\nNO OF ELEMENTS: ");
	scanf("%d",&n);

	arr = (int*)malloc(n * sizeof(int));
	flag = (int*)malloc(n * sizeof(int));
	for(i=0; i<n; i++)
		flag[i]=0;
	printf("\nENTER THE ELEMENTS...");
	for(i=0; i<n; i++) {
		printf("\nELEMENT [%d]: ",i+1);
		scanf("%d",&arr[i]);
	}

	sort(arr,n);
	MRT(arr,n,cap,ntapes,flag);
}
```

Output →



```
[(base) amoddhopavkar@Amods-MacBook-Air Documents % gcc OptimalTape.c -o OptimalTape
[(base) amoddhopavkar@Amods-MacBook-Air Documents % ./OptimalTape

---OPTIMAL STORAGE ON TAPES---

NO OF TAPES: 2

ENTER SIZE OF TAPE 1: 45

ENTER SIZE OF TAPE 2: 50

NO OF ELEMENTS: 5

ENTER THE ELEMENTS...
ELEMENT [1]: 12

ELEMENT [2]: 15

ELEMENT [3]: 18

ELEMENT [4]: 5

ELEMENT [5]: 9

ORDER OF ELEMENTS AS STORED ON THE TAPES...
TAPE 1: 5       12      18
SIZE: 35

MRT OF TAPE 1: 19.00

TAPE 2: 9       15
SIZE: 24

MRT OF TAPE 2: 16.50
(base) amoddhopavkar@Amods-MacBook-Air Documents %
```