**EXP NO 1 :- IMPLEMENT INSERTION SORT**

CODE:-

#include <math.h>

#include <stdio.h>

void insertionSort(int arr[], int n)

{

int i, key, j;

for (i = 1; i < n; i++)

{

key = arr[i];

j = i - 1;

while (j >= 0 && arr[j] > key)

{

arr[j + 1] = arr[j];

j = j - 1;

}

arr[j + 1] = key;

}

}

void printArray(int arr[], int n)

{

int i;

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

printf("%d ", arr[i]);

printf("\n");

}

int main()

{

int arr[] = {12, 11, 13, 5, 6};

int n = sizeof(arr) / sizeof(arr[0]);

insertionSort(arr, n);

printArray(arr, n);

return 0;

}

OUTPUT:-



**EXP NO 2 :- IMPLEMENT SELECTION SORT**

CODE:-

#include <stdio.h>

void swap(int \*xp, int \*yp)

{

int temp = \*xp;

\*xp = \*yp;

\*yp = temp;

}

void selectionSort(int arr[], int n)

{

int i, j, min\_idx;

for (i = 0; i < n-1; i++)

{

min\_idx = i;

for (j = i+1; j < n; j++)

if (arr[j] < arr[min\_idx])

min\_idx = j;

if(min\_idx != i)

swap(&arr[min\_idx], &arr[i]);

}

}

void printArray(int arr[], int size)

{

int i;

for (i=0; i < size; i++)

printf("%d ", arr[i]);

printf("\n");

}

int main()

{

int arr[] = {64, 25, 12, 22, 11};

int n = sizeof(arr)/sizeof(arr[0]);

selectionSort(arr, n);

printf("Sorted array: \n");

printArray(arr, n);

return 0;

}

OUTPUT:-

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**EXP NO 3:- IMPLEMENT QUICK SORT**

Input:-

#include <stdio.h>

void swap(int \*a, int \*b)https://learn.onlinegdb.com/ {

int t = \*a; +

\*a = \*b;

\*b = t;

}

int partition(int array[], int low, int high) {

int pivot = array[high];

int i = (low - 1);

for (int j = low; j < high; j++) {

if (array[j] <= pivot) {

i++;

swap(&array[i], &array[j]);

}

}

swap(&array[i + 1], &array[high]);

return (i + 1);

}

void quickSort(int array[], int low, int high) {

if (low < high) {

int pi = partition(array, low, high);

quickSort(array, low, pi - 1);

quickSort(array, pi + 1, high);

}

}

void printArray(int array[], int size) {

for (int i = 0; i < size; ++i) {

printf("%d ", array[i]);

}

printf("\n");

}

int main() {

int data[] = {8, 7, 2, 1, 0, 9, 6};

int n = sizeof(data) / sizeof(data[0]);

printf("Unsorted Array\n");

printArray(data, n);

quickSort(data, 0, n - 1);

printf("Sorted array in ascending order: \n");

printArray(data, n);

}

Output:-



**EXP NO 4:- IMPLEMENT BINARY SORT**

CODE:-

#include <stdio.h>

int binarySearch(int arr[], int l, int r, int x)

{

while (l <= r) {

int m = l + (r - l) / 2;

if (arr[m] == x)

return m;

if (arr[m] < x)

l = m + 1;

else

r = m - 1;

}

return -1;

}

int main(void)

{

int arr[] = { 2, 3, 4, 10, 40 };

int n = sizeof(arr) / sizeof(arr[0]);

int x = 10;

int result = binarySearch(arr, 0, n - 1, x);

(result == -1) ? printf("Element is not present"

" in array")

: printf("Element is present at "

"index %d",

result);

return 0;

}

OUTPUT:-



**EXP NO 5:- IMPLEMENT KNAPSACK ALGORITHM**

INPUT:-

#include<stdio.h>

int max(int a, int b) {

if(a>b){

return a;

} else {

return b;

}

}

int knapsack(int W, int wt[], int val[], int n) {

int i, w;

int knap[n+1][W+1];

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

for (w = 0; w <= W; w++) {

if (i==0 || w==0)

knap[i][w] = 0;

else if (wt[i-1] <= w)

knap[i][w] = max(val[i-1] + knap[i-1][w-wt[i-1]], knap[i-1][w]);

else

knap[i][w] = knap[i-1][w];

}

}

return knap[n][W];

}

int main() {

int val[] = {20, 25, 40};

int wt[] = {25, 20, 30};

int W = 50;

int n = sizeof(val)/sizeof(val[0]);

printf("The solution is : %d", knapsack(W, wt, val, n));

return 0;

}

OUTPUT:-



**EXP NO 6:- IMPLEMENT PRIMS ALGORITHM**

INPUT:-

#include <stdio.h>

int max(int a, int b) { return (a > b) ? a : b; }

int knapSack(int W, int wt[], int val[], int n)

{

if (n == 0 || W == 0)

return 0;

if (wt[n - 1] > W)

return knapSack(W, wt, val, n - 1);

else

return max(

val[n - 1]

+ knapSack(W - wt[n - 1], wt, val, n - 1),

knapSack(W, wt, val, n - 1));

}

int main()

{

int profit[] = { 60, 100, 120 };

int weight[] = { 10, 20, 30 };

int W = 50;

int n = sizeof(profit) / sizeof(profit[0]);

printf("%d", knapSack(W, weight, profit, n));

return 0;

}

OUTPUT:-



**EXP NO 7:- IMPLEMENT KRUSKALS ALGORITHM**

INPUT:-

#include <stdio.h>

#include <stdlib.h>

#define MAX\_EDGES 1000

typedef struct Edge {

int src, dest, weight;

} Edge;

typedef struct Graph {

int V, E;

Edge edges[MAX\_EDGES];

} Graph;

typedef struct Subset {

int parent, rank;

} Subset;

Graph\* createGraph(int V, int E) {

Graph\* graph = (Graph\*) malloc(sizeof(Graph));

graph->V = V;

graph->E = E;

return graph;

}

int find(Subset subsets[], int i) {

if (subsets[i].parent != i) {

subsets[i].parent = find(subsets, subsets[i].parent);

}

return subsets[i].parent;

}

void Union(Subset subsets[], int x, int y) {

int xroot = find(subsets, x);

int yroot = find(subsets, y);

if (subsets[xroot].rank < subsets[yroot].rank) {

subsets[xroot].parent = yroot;

} else if (subsets[xroot].rank > subsets[yroot].rank) {

subsets[yroot].parent = xroot;

} else {

subsets[yroot].parent = xroot;

subsets[xroot].rank++;

}

}

int compare(const void\* a, const void\* b) {

Edge\* a\_edge = (Edge\*) a;

Edge\* b\_edge = (Edge\*) b;

return a\_edge->weight - b\_edge->weight;

}

void kruskalMST(Graph\* graph) {

Edge mst[graph->V];

int e = 0, i = 0;

qsort(graph->edges, graph->E, sizeof(Edge), compare);

Subset\* subsets = (Subset\*) malloc(graph->V \* sizeof(Subset));

for (int v = 0; v < graph->V; ++v) {

subsets[v].parent = v;

subsets[v].rank = 0;

}

while (e < graph->V - 1 && i < graph->E) {

Edge next\_edge = graph->edges[i++];

int x = find(subsets, next\_edge.src);

int y = find(subsets, next\_edge.dest);

if (x != y) {

mst[e++] = next\_edge;

Union(subsets, x, y);

}

}

printf("Minimum Spanning Tree:\n");

for (i = 0; i < e; ++i) {

printf("(%d, %d) -> %d\n", mst[i].src, mst[i].dest, mst[i].weight);

}

}

int main() {

int V, E;

printf("Enter number of vertices and edges: ");

scanf("%d %d", &V, &E);

Graph\* graph = createGraph(V, E);

printf("Enter edges and their weights:\n");

for (int i = 0; i < E; ++i) {

scanf("%d %d %d", &graph->edges[i].src, &graph->edges[i].dest, &graph->edges[i].weight);

}

kruskalMST(graph);

return 0;

}

OUTPUT:-

