Reg no:2021BIT505
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Practical -04

1.travelling salesman problem

Code:

```cpp
#include <iostream>

using namespace std;

const int n = 4;

const int MAX = 1000000;

int dist[n + 1][n + 1] = {
    {0, 0, 0, 0, 0},
    {0, 0, 10, 15, 20},
    {0, 10, 0, 25, 25},
    {0, 15, 25, 0, 30},
    {0, 20, 25, 30, 0},
};

int memo[n + 1][1 << (n + 1)];

int fun(int i, int mask)
{

    if (mask == ((1 << i) | 3))
        return dist[1][i];

    if (memo[i][mask] != 0)
        return memo[i][mask];

    int res = MAX;

    for (int j = 1; j <= n; j++)
        if ((mask & (1 << j)) && j != i && j != 1)
            res = std::min(res, fun(j, mask & (~(1 << i))) + dist[j][i]);
    return memo[i][mask] = res;
}

int main()
{
    int ans = MAX;
    for (int i = 1; i <= n; i++)

        ans = std::min(ans, fun(i, (1 << (n + 1)) - 1) + dist[i][1]);
```

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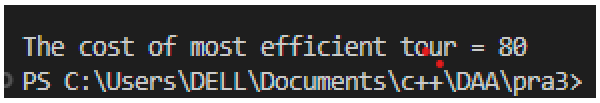
```
    printf("The cost of most efficient tour = %d", ans);

    return 0;
}
```

Output:



```
The cost of most efficient tour = 80
PS C:\Users\DELL\Documents\c++\DAA\pra3>
```

2.BF string matching algorithm

Code:

```
#include <istream>
using namespace std;
#include <bits/stdc++.h>
int BF (const char *str1, const char *str2)
{
    int str1_len = strlen (str1);
    int str2_len = strlen (str2);
    int i = 0;
    int j = 0;

    if (str1 == NULL || str2 == NULL) {
        return-1;
    }

    while (i < str1_len && j < str2_len) {
        if (str1[i] == str2[j]) {
            i++;
            j++;
            //Equality continues to be compared
        }
        else{
            i = i-j + 1;
            j = 0;
           // Not equal to the main string backtracking, re-compare
        }
    }
    if (j == str2_len) {

        return i-j;
```

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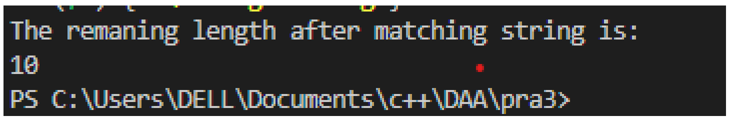
```
    } else
    {
    return-1;
    }
}
int main(){

    const char str1 []="ABABDABACDABABCABAB";
    const char str2 []= "ABABCABAB";
    cout<<"The remaning length after matching string is: "<<endl;
    cout<<BF(str1,str2);


    return 0;



}
```

OUTPUT:



```
The remaning length after matching string is:
10
PS C:\Users\DELL\Documents\c++\DAA\pra3>
```

3.Exhaustive Search algorithm

Code:

```

#include <bits/stdc++.h>
using namespace std;

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);
```

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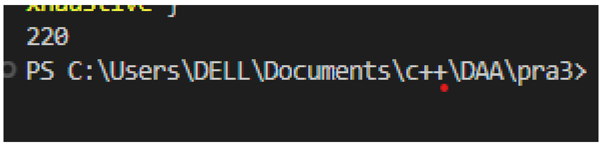
```
    else
        return max(
            val[n - 1] + knapSack(W - wt[n - 1], wt, val, n - 1),
            knapSack(W, wt, val, n - 1));
}

int main()
{
    int val[] = {60, 100, 120};
    int wt[] = {10, 20, 30};
    int W = 50;
    int n = sizeof(val) / sizeof(val[0]);
    cout << knapSack(W, wt, val, n);
    return 0;
}
```

Output:



```
220
PS C:\Users\DELL\Documents\c++\DAA\pra3>
```