



Design & Analysis Of Algorithm

Lab Experiment -7

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SUBJECT: DESIGN & ANALYSIS OF ALGORITHM

SUBJECT CODE: 19CSE302

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EX NO:7

Maximum Sub array Sum – Kadane's Algorithm.

AIM:

To write an algorithm to implement Maximum Sub array Sum.

ALGORITHM:

Initialize:

max_so_far = INT_MIN

max_ending_here = 0

Loop for each element of the array

(a) max_ending_here = max_ending_here + a[i]

(b) if(max_so_far < max_ending_here)

max_so_far = max_ending_here

(c) if(max_ending_here < 0)

max_ending_here = 0

return max_so_far

Step 1: BEGIN

2: Get length of array

3: Initialize empty array A = []

4: Get array A from user

5: Set sum = 0

6: Set max_sum = A[0]

7: Set sub_array = [A[0]]

8: FOR i in range(0,n)

```

Set sum+=A[i]
IFsum<0:
    Do sub_array.clear()
    Dosub_array.append(A[i])
    Updatesum=A[i]
ELSE IFsum>max_sum
    Update max_sum=
    Do sub_array.append(A[i])
    Set a = copy.deepcopy(sub_array)
ELSE
    Do sub_array.append(A[i])
9: Print max sum
10: Print maximum subarray
11: END

```

CODE SCREEN:

```

from sys import maxsize

def maxSubArraySum(a, size):

    max_so_far = -maxsize - 1
    max_ending_here = 0
    start = 0
    end = 0
    s = 0

    for i in range(0, size):

```

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        max_ending_here += a[i]

    if max_so_far < max_ending_here:
        max_so_far = max_ending_here
        start = s
        end = i

    if max_ending_here < 0:
        max_ending_here = 0
        s = i+1

    print("Maximum contiguous sum is %d" % (max_so_far))
    print("Starting Index %d" % (start))
    print("Ending Index %d" % (end))

a = [-1,2,-1,3,-1,-4,3,-1,7,-2]
maxSubArraySum(a, len(a))

```

OUTPUT SCREEN :

```

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  JUPYTER

Windows PowerShell
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PS D:\python> & C:/Users/HP/AppData/Local/Programs/Python/Python310/python.exe d:/python/DAA/maxsubarray.py
Maximum contiguous sum is 9
Starting Index 6
Ending Index 8
PS D:\python>

```

TIME COMPLEXITY:

$O(N)$

Max sub array (kadane's Algorithm)

Array = -1, 2, -1, 3, -1, -4, 3, -1, 7, -2
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
Subarray = -1, 2, -1, 3, -1, -4, 3, -1, 7, -2
+ 1
Sum of array = ~~-1~~, 2, 1, 1, 3, ~~-1~~, (3 2 9) 7

max array = 3, -1, 7 = 9 //

max of sum = 9

RESULT:

I have studied and understood the Maximum Sub array Sum in python language and executed the program successfully.

THANK YOU !!