**Tugas Praktikum 7**

**Analisis Algoritma**

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**PROGRAM STUDI S1 TEKNIK INFORMATIKA**

**FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM**

**UNIVERSITAS PADJADJARAN**

**TAHUN AJARAN 2018/2019**

1. Cari algoritma Matrix Chain Multiplication Problem, dan buat programnya
2. Cari algoritma Longest Common Subsequence, dan buat programnya, bandingkan dengan perhitungan manual di kertas

Jawab:

1. Algoritma

matrix-multiply(a,b)

//ncolumns = number of collumn

//nrows = number of rows

if ncolumns[A] =/= nrows[B]

then error "incompatible dimensions"

else for i<-1 to nrows[A]

do for j<-1 to ncolumns[B]

do C[i,j] <-0

for k<-1 to ncolumns[A]

do C[i,j] <- C[i,j] + A[i,k].B[k,j]

return C

//nkolom = panjang kolom

//nbaris = panjang baris

Source Code

#include<stdio.h>

#include<limits.h>

// Matrix Ai has dimension p[i-1] x p[i] for i = 1..n

int MatrixChainOrder(int p[], int n)

{

/\* For simplicity of the program, one extra row and one

extra column are allocated in m[][]. 0th row and 0th

column of m[][] are not used \*/

int m[n][n];

int i, j, k, L, q;

/\* m[i,j] = Minimum number of scalar multiplications needed

to compute the matrix A[i]A[i+1]...A[j] = A[i..j] where

dimension of A[i] is p[i-1] x p[i] \*/

// cost is zero when multiplying one matrix.

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

m[i][i] = 0;

// L is chain length.

for (L=2; L<n; L++)

{

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

{

j = i+L-1;

m[i][j] = INT\_MAX;

for (k=i; k<=j-1; k++)

{

// q = cost/scalar multiplications

q = m[i][k] + m[k+1][j] + p[i-1]\*p[k]\*p[j];

if (q < m[i][j])

m[i][j] = q;

}

}

}

return m[1][n-1];

}

int main()

{

int arr[] = {1, 2, 3, 4};

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

printf("Minimum number of multiplications is %d ",

MatrixChainOrder(arr, size));

getchar();

return 0;

}

Screenshot



1. Algoritma

lcs-length(x,y)

m<-length[x]

n<-length[y]

for i<-1 to m do c[i,0]<-0

for j<-0 to n do c[0,j]<-0

for i<-1 to m

do for j<-1 to n

do if xi==yj

then c[i,j]<-c[i-1,j-1]+1

b[i,j]<-"panahkiriatas"

else if c[i-1,j]>=c[i,j-1]

then c[i,j]<-c[i-1,j]

b[i,j]<-"panahatas"

else c[i,j]<-c[i,j-1]

b[i,j]<-"panahkiri"

return c and b

Source Code

/\* Dynamic Programming C/C++ implementation of LCS problem \*/

#include<bits/stdc++.h>

int max(int a, int b);

/\* Returns length of LCS for X[0..m-1], Y[0..n-1] \*/

int lcs( char \*X, char \*Y, int m, int n )

{

int L[m+1][n+1];

int i, j;

/\* Following steps build L[m+1][n+1] in bottom up fashion. Note

that L[i][j] contains length of LCS of X[0..i-1] and Y[0..j-1] \*/

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

{

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

{

if (i == 0 || j == 0)

L[i][j] = 0;

else if (X[i-1] == Y[j-1])

L[i][j] = L[i-1][j-1] + 1;

else

L[i][j] = max(L[i-1][j], L[i][j-1]);

}

}

/\* L[m][n] contains length of LCS for X[0..n-1] and Y[0..m-1] \*/

return L[m][n];

}

/\* Utility function to get max of 2 integers \*/

int max(int a, int b)

{

return (a > b)? a : b;

}

/\* Driver program to test above function \*/

int main()

{

char X[] = "RENDANG";

char Y[] = "NANGKA";

int m = strlen(X);

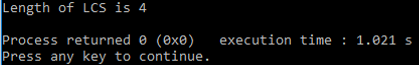
int n = strlen(Y);

printf("Length of LCS is %d", lcs( X, Y, m, n ) );

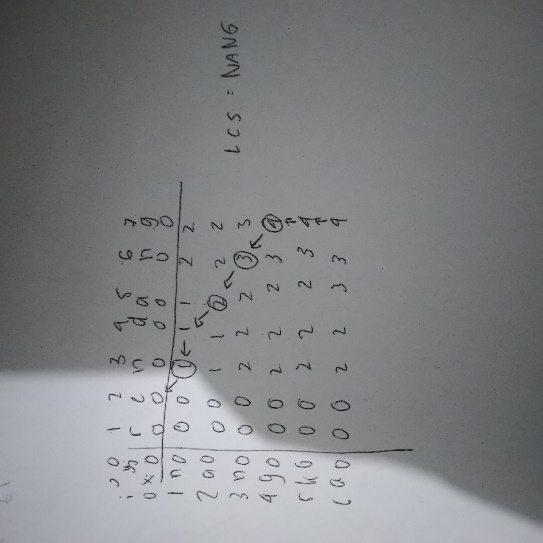
return 0;

}

Screenshot



Perhitungan manual



Hasil: Sama menghasilkan Panjang 4 karakter yaitu N A N G