

السلام عليكم ورحمه الله

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- سكشن: 1

- المحتوى: شرح ثالث تاسك بالتفصيل ودي طريقه تاني غيرالى اتنقشط فيها دي احسن
- وانا بعت لحضرتك التلت تسكات مع الشرح ليهم ف اخر الكود «شرح مختصر»

• ف فديوا شرح لتاسك الثالث

1-main idea of my task :

I make number of comm and num of process in comm are a variable

and I will show two test case :

one of them when num of comm equal 2 and num of process in each comm is 2

other when num of comm equal 3 and num of process in each comm is 3 and **you can change as you like**

when num of comm equal 2 and num of process
in eavh comm is 2

first N/2 fitst Q/2	first N/2 second Q/2	f
second N/2 fitst Q/2	second N/2 second Q/2	s

when num of comm equal 3 and num of process in eavh comm is 3 and you can change as you like

first N/3 fitst Q/3	first N/3 second Q/3	first N/3 third Q/3
second N/3 fitst Q/3	second N/3 second Q/3	second N/3 third Q/3
third N/3 fitst Q/3	third N/3 second Q/3	third N/3 third Q/3

I make two type of comm “two away to splite wold comm”
 first way call col comm:
 evray comlumn is comm
 node0 ,node 1 is first comm in col_comm
 node 2,node3 is second comm in col_comm

first N/2 first Q/2 node 0	first N/2 second Q/2 node 2	f
second N/2 first Q/2 node 1	second N/2 second Q/2 node 3	

A second way call “row comm” this contain
 first node in every col_comm
 node 0,node 2 is represent the row comm

first N/2 first Q/2 node 0	first N/2 second Q/2 node 2	f
second N/2 first Q/2 node 1	second N/2 second Q/2 node 3 	

2-What is use of row comm?

1-to make bcast to database array on it and then every col comm make scatter on database array “by this way distributed DB array on all node as Dr want”

2-to make scatter to Query array on it then every col comm make bcast on Query array “by this way distributed Query array on all node as Dr want”

3-describe the main idea

- 1-I made num of commencator in each commencator I have made num of node
- 2- in each nodel have made 2 thred
- 3-in every comm first node take first half of local databse and second node take Second half of databse as so on..
- 5-every node in first comm take first half of quarry and every node in second comm take second half of quarry “array of string” ans so on...
- 7- ervey thread in any of node take the half of quarry of this node

4- my logic of code for each thread in any process

- 1- each process have array of string call DB of size $100000/(\text{num of process in comm})$
- And have array of string call quarry of size $12/(\text{num of comm})$
- 2- each process create two thread
- First thread work on first hlf of string in local quarry and all local database and put resul in glable vector call final_rest_thrads
- Second thread work on second half of string in quarry and and all local database array and put resul in glable vector call final_rest_thrads
- 3- then make gather on final_rest_thrads in first and second comm
- This mean that process0 in first in every comm collect the recive vector" final_rest_thrad " from other process on its Vector "final_rest_thrad " Note that not every row will recv be under the last row in final_rest_thrad , but I will collect the corresponding rows "work of gather"

5-code when have 2 comm and two process in each of theam “you can change it easy and I will explained it”

6.1-function call for edit distance

```
int edit_distance(char A[], char B[], int string_length)
{
    /*-----edit_distance dp table-----*/
    vector<vector<int>> M(string_length + 1, vector<int>(string_length + 1));
    for (int i = 0; i <= string_length; ++i)
        M[i][0] = i;
    for (int i = 0; i <= string_length; ++i)
        M[0][i] = i;
    for (int a = 1; a <= string_length; ++a) {
        for (int b = 1; b <= string_length; ++b)
        {
            int x = M[a - 1][b] + 1;
            int y = M[a][b - 1] + 1;
            int z = M[a - 1][b - 1] + (A[a - 1] == B[b - 1] ? 0 : 1);
            M[a][b] = MIN(MIN(x, y), z);
        }
    }
    return M[string_length][string_length];
}
```

5.3-function for generate 2D array of string of n row and length of row m

```
void generate_string(char array_of_string[][11], int n, int m) {  
    /*-----generate 2D array of string of n row and length of row m "-----*/  
    char chars[] = "abcdefghijklmnopqrstuvwxyz";  
    for (int i = 0; i < n; i++)  
    {  
        for (int j = 0; j < m; j++) {  
            int idx = rand() % 26;  
            array_of_string[i][j] = chars[idx];  
        }  
        array_of_string[i][m] = '\0';  
    }  
}
```

5.4-function for allocate 2D dynamic array have number of row equal row and num of column equal cols

```
char** alloc_2d_int(int rows, int cols) {  
    char** array = (char**)malloc(rows * sizeof(char*));  
    for (int i = 0; i < rows; i++)  
        array[i] = (char*)malloc((cols) * sizeof(char));  
    return array;  
}
```

5.5-function for allocate 1D dynamic array have number of element equal row * col

```
char* alloc_1d_int(int rows, int col) {  
    char* array = (char*)malloc(rows * col * sizeof(char));  
    return array;  
}
```

5.5-function for convert 2D to 1D ,function take 2D array and return 1D array have number of element equal row*col

```
char* convert_2d_to_1d(char** arr, int rows, int cols) {  
    char* x = (char*)malloc( rows * (cols)* sizeof(char));  
    for (int i = 0; i < rows; i++)  
        for (int j = 0; j < cols; j++)  
            x[i * (cols) + j] = arr[i][j];  
    return x;  
}
```

5.6-function for convert to 2D from 1D ,function take 1D array and return 2D array have number of row equal row and each row have number of char equal col

```
char** convert_1d_to_2d(char* arr, int rows, int cols) {  
    char** x = (char**)malloc(rows * sizeof(char*));  
    for (int i = 0; i < rows; i++) {  
        x[i] = (char*)malloc(sizeof(char) * (cols));  
    }  
    for (int i = 0; i < rows; i++)  
        for (int j = 0; j < cols; j++)  
            x[i][j] = arr[i * (cols) + j];  
    return x;  
}
```

5.7-what is use of function for convert to 2D from 1D and function for convert to 1D from 2D ? Use in Bcast and Scatter Because I searche and fund you can not send dynamic 2D array because pointer not They weren't after each other

so that I convert generate 2D array and before Bcast or scatter I convert it to 1D and after Bcast I convert it to 2D again so I Make 2 function My_scatter and My_Bcast to convert from and to 2D array after make Bcast or scatter

5.8-so I function My_scatter to convert from 1D array before make scatter and convert to 2D array after make scatter

```
char** MyScatter(char** _2DArray, int row, int subrow, int string_length,  
MPI_Datatype MPI_char_CONTIGUOUS_T, MPI_Comm comm) {  
    char* x = convert_2d_to_1d(_2DArray, row, string_length);  
    char* xx = alloc_1d_int(subrow, string_length);  
    MPI_Scatter(x, subrow, MPI_char_CONTIGUOUS_T,  
               xx, subrow, MPI_char_CONTIGUOUS_T, 0, comm);  
    char** _2D = convert_1d_to_2d(xx, subrow, string_length);  
    return _2D;  
}
```

5.8-so I function My_Bcast to convert from 1D array before make Bcast and convert to 2D array after make scatter

```
char** MyBcast(char** _2DArray, int row, int string_length,  
MPI_Datatype MPI_char_CONTIGUOUS_T, MPI_Comm comm) {  
    char* x = convert_2d_to_1d(_2DArray, row, string_length);  
    MPI_Bcast(x, row, MPI_char_CONTIGUOUS_T, 0, comm);  
    char** _2D = convert_1d_to_2d(x, row, string_length);  
    return _2D;  
}
```

5.9-pramter I do not make any pramtter static “as Dr want ”

```
int      comm_sz;    /*-----4-----*/
int      glable_rank; /*-----0 1 2 3 ----*/
int Qn = 12;        /*-----have 8 string in qyaery ----*/
int Nn = 1200;       /*-----have 100000 string in DB----*/
int string_length = 11; /*-----size of string in DB and quary ----*/
int size_local_Query;
int size_local_N;
char**Q_2D;          /*---2d array for Quary ----*/
char**N_2D;          /*---2d array for database ----*/
char** local_N;// [size_local_N] [string_length + 1] ; /*--- array for local database --
char** local_query;// [size_local_Query] [string_length + 1] ; /*--- array for local qua
vector<vector<pair<int, int>>> fianl_ans_threads;
const int NumComm = 2;
```

5.10- allocate all array dynamic not static
“as Dr want ”

```
int NumNodeInEachComm = comm_sz / NumComm;  
size_local_N = Nn / NumNodeInEachComm;  
size_local_Quary = Qn / NumComm;  
fianl_ans_threads = vector<vector<pair<int, int>>>(size_local_Quary);  
N_2D = alloc_2d_int(Nn, string_length );  
Q_2D = alloc_2d_int(Qn, string_length );  
local_N = alloc_2d_int(size_local_N, string_length );  
local_quary = alloc_2d_int(size_local_Quary, string_length);
```

In main

5.3-make new datatype “string” to optimize the time of commincation

```
////////////////////////////////////  
MPI_Datatype MPI_char_CONTIGUOUS_T;  
MPI_Type_contiguous(11, MPI_CHAR, &MPI_char_CONTIGUOUS_T);  
MPI_Type_commit(&MPI_char_CONTIGUOUS_T);  
////////////////////////////////////
```

5.4-make make first commincator "col comm"

```
/*-----make commincator -----*/  
  
MPI_Comm row_comm, col_comm;  
int row_rank, col_rank, col_size, row_size;  
int colour = glable_rank / NumNodeInEachComm;  
MPI_Comm_split(MPI_COMM_WORLD, colour, glable_rank, &row_comm);  
MPI_Comm_rank(row_comm, &row_rank);  
MPI_Comm_size(row_comm, &row_size);
```

5.5-make make second commincator "row comm"

```
colour = glabel_rank % NumNodeInEachComm;  
MPI_Comm_split(MPI_COMM_WORLD, colour, glabel_rank, &col_comm);  
MPI_Comm_rank(col_comm, &col_rank);  
MPI_Comm_size(col_comm, &col_size);
```

6.6-generate random string for database and query

```
if (glabel_rank == 0) {  
    generate_string(N_2D, Nn, string_length); /*-----generate random string for data  
    generate_string(Q_2D, Qn, string_length); /*-----generate random string for query  
}
```


6.7-make bcast for Database on the first node on every col_comm and
-make scatter for query on the first node on every col_comm and

```
if (row_rank == 0) { // if 2 comm and 2 procss then 0,2 in glable go in  
  
    N_2D = MyBcast(N_2D, Nn, string_length, MPI_char_CONTIGUOUS_T, col_comm);  
    local_query = MyScatter(Q_2D, Qn, size_local_Query,  
                           string_length, MPI_char_CONTIGUOUS_T, col_comm);  
}
```

After 6.7

node0 have first half of query and all database

node 2 have second half of query and all database

all database first Q/2	node 0	all database second Q/2	node 2
node 1	node 3		

6.8-after (6.7) every comm" in first node " have all database so can make scatter on it
to distribute on process and result of scatter in local_N
line in second screen do this

```
if (row_rank == 0) { // if 2 comm and 2 procss then 0,2 in glable go in
```

```
    N_2D = MyBcast(N_2D, Nn, string_length, MPI_char_CONTIGUOUS_T, col_comm);
```

```
    local_quary = MyScatter(Q_2D, Qn, size_local_Quary,  
        string_length, MPI_char_CONTIGUOUS_T, col_comm);
```

```
}
```

```
local_N = MyScatter(N_2D, Nn, size_local_N, string_length, MPI_char_CONTIGUOUS_T, row_comm);
```

```
local_quary= MyBcast(local_quary, size_local_Quary, string_length, MPI_char_CONTIGUOUS_T, row_comm);
```

```
//
```

```
local_N = MyScatter(N_2D, Nn, size_local_N, string_length, MPI_char_CONTIGUOUS_T, row_comm);
```

6.9-after (6.7) every comm "in first node" have first part or second part so on... of query so can make Bcast on it to distribute on process and store it in local_query
line in second screen do this

```
if (row_rank == 0) { // if 2 comm and 2 procss then 0,2 in glable go in
```

```
    N_2D = MyBcast(N_2D, Nn, string_length, MPI_char_CONTIGUOUS_T, col_comm);
```

```
    local_query = MyScatter(Q_2D, Qn, size_local_Query,  
        string_length, MPI_char_CONTIGUOUS_T, col_comm);
```

```
}
```

```
local_N = MyScatter(N_2D, Nn, size_local_N, string_length, MPI_char_CONTIGUOUS_T, row_comm);
```

```
local_query = MyBcast(local_query, size_local_Query, string_length, MPI_char_CONTIGUOUS_T, row_comm);
```

```
//
```

```
local_query = MyBcast(local_query, size_local_Query, string_length, MPI_char_CONTIGUOUS_T, row_comm);
```

```
//
```

6.12-make two thread in every process

```
long        thread;
pthread_t*  thread_handles;
thread_handles = (pthread_t*)malloc(thread_count * sizeof(pthread_t));
for (thread = 0; thread < thread_count; thread++)
    pthread_create(&thread_handles[thread], NULL,
                  taske, (void*)thread);
/*-----wait untile all process end-----*/
for (thread = 0; thread < thread_count; thread++)
    pthread_join(thread_handles[thread], NULL);
free(thread_handles);
```

6.13-work for every thread “we have 2 thread in every process”
every thread take half of straining in quarry array and all database string array in its process to make edit distance on it

```
void* taske(void* rank) {
    /* ---pramter and argument is private "alocated for each thread" ---- */
    int my_rank_tread = (long)rank;
    int local_m = size_local_Query / thread_count; /* -----*/
    int my_first_row = my_rank_tread * local_m; /* -----*/
    int my_last_row = (my_rank_tread + 1)*local_m - 1;
    vector<pair<int, int>> edit_distance_reslt(size_local_N);
    for (int i = my_first_row; i <=my_last_row; i++)//1
    {
        for (int j = 0; j < size_local_N; j++)//10
        {
            int res = edit_distance(local_query[i],local_N[j] ,string_length);
            edit_distance_reslt[j].first = res;
            edit_distance_reslt[j].second = j;
            // ...
            fianl_ans_threads[i].push_back(edit_distance_reslt[j]);///ABC quaeay
        }
    }

    return NULL;
}
```

6.14-Result for thrad0 will put in vector of pair call
final_ans_threads and Result for thrad1 will put in same vector
put in deffrent row
why we save value and index as when sort vector the index is
change

```
+  
// ...  
final_ans_threads[i].push_back(edit_distance_reslt[j]);  
}  
}  
return NULL;
```

6.16- put 2D vector of pair in two array one for edit distance value and other of index in Database and make gather on each array to collect the receive vector "final_rest_thread" from other process on its Vector "final_rest_thread" for process 0

Not every row will recv be under the last row in final_rest_thread, but I will collect the corresponding rows "this is work of gather"

```
int local_val[size_local_N], local_index[size_local_N];
int val[Nn], index[Nn];
/* ---i will gather all local_val and local_index from each process in and val index-- */
for (int i = 0; i < size_local_Quary; i++) {
    int vector_size = fianl_ans_threads[i].size();
    for (int j = 0; j < vector_size; j++) {
        local_val[j] = fianl_ans_threads[i][j].first;
        local_index[j] = fianl_ans_threads[i][j].second + (vector_size * my_rank);
    }
    MPI_Gather(local_val, size_local_N, MPI_INT, val, size_local_N, MPI_INT, 0, first_comm);
    MPI_Gather(local_index, size_local_N, MPI_INT, index, size_local_N, MPI_INT, 0, first_comm);
    if (subMyReank == 0) {
        for (int z = size_local_N; z < Nn; z++) {
            fianl_ans_threads[i].push_back({ val[z], index[z] });
        }
    }
}
```


6.17- show the result :

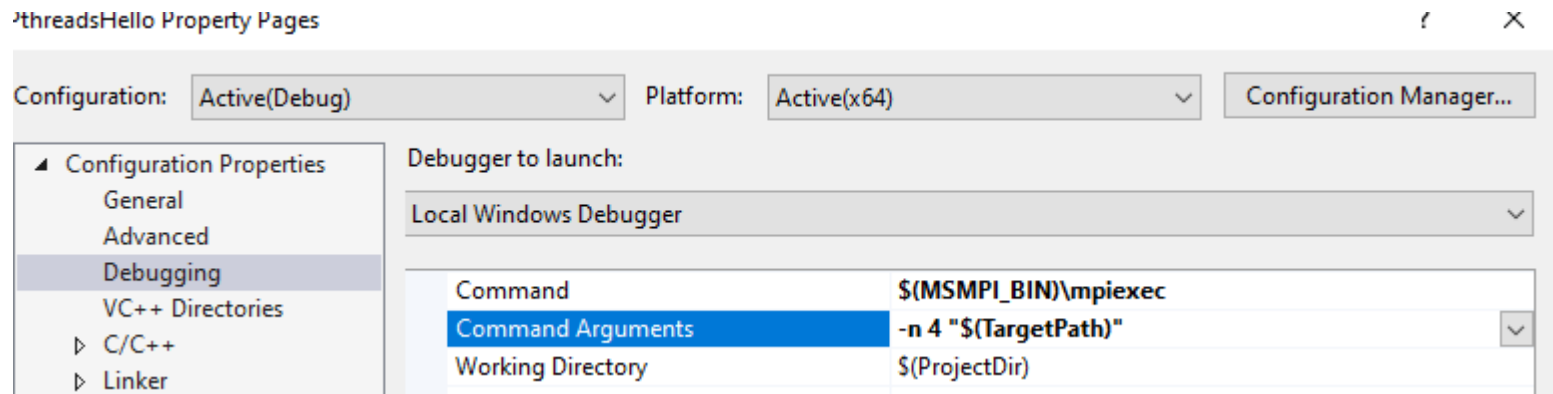
I will show three result edit value and index in DB string in DB

```
if (my_rank == 0) {
    for (int i = 0; i < size_local_Quary; i++) {
        sort(fianl_ans_threads[i].begin(), fianl_ans_threads[i].end());
        for (int z = 0; z < Nn&& z < 10; z++) {
            printf("|  edit val: %d and index in DB: %d string in DB %s |\n",
                   fianl_ans_threads[i][z].first, fianl_ans_threads[i][z].second,
                   N_2D[fianl_ans_threads[i][z].second]);
        }
        printf("\n");
    }
}
```

8-”pramter when have 2 comm and 2 process in comm”

make Numcomm=2 and num of process shoud dividable by Numcomm like 4 “doctor tell us this ”

```
int NumComm = 2;  
int NumNodeInEachComm:
```



8.1-"output when have 2 comm and 2 process in comm"
there are 8 section as I have 8 string in quarry,I show smalist 10 string for
every quarry and I show three value in every row of screen
first is the value of edit dectance ,second is index of string in database
third is string in database

Select Microsoft Visual Studio Debug Console

```
edit val: 6 and index in DB: 201 string in DB ivvgobqnc |
edit val: 6 and index in DB: 6134 string in DB egaqxzvv |
edit val: 6 and index in DB: 7040 string in DB tqjmaorgdv |
edit val: 6 and index in DB: 8411 string in DB obnqpojcxw |
edit val: 6 and index in DB: 9147 string in DB yurxpsdvw |
edit val: 7 and index in DB: 150 string in DB oqylobcwqx |
edit val: 7 and index in DB: 216 string in DB edzlodscke |
edit val: 7 and index in DB: 494 string in DB xtyvoxhfkx |
edit val: 7 and index in DB: 602 string in DB ovdlnbfrkv |
edit val: 7 and index in DB: 606 string in DB htosfytlluc |
```

```
edit val: 6 and index in DB: 2168 string in DB kpaftzdvxv |
edit val: 6 and index in DB: 2544 string in DB uagxntvbpm |
edit val: 6 and index in DB: 2977 string in DB iufyztqscj |
edit val: 6 and index in DB: 3959 string in DB wqfdikvjpp |
edit val: 6 and index in DB: 5541 string in DB vwaczwfeme |
edit val: 6 and index in DB: 6133 string in DB xqyugcemb1 |
edit val: 6 and index in DB: 6420 string in DB pozgdrkfme |
edit val: 6 and index in DB: 7294 string in DB ahcvjokziz |
edit val: 6 and index in DB: 7852 string in DB zxqkqrqmuo |
edit val: 6 and index in DB: 9859 string in DB fzqqadrfrk |
```

```
edit val: 5 and index in DB: 9921 string in DB ajwkbcksfz |
edit val: 6 and index in DB: 6486 string in DB bauzpglfnf |
edit val: 6 and index in DB: 6967 string in DB ujplicicq |
edit val: 6 and index in DB: 8185 string in DB nxsokceogau |
edit val: 6 and index in DB: 8605 string in DB nhuyqkfefu |
edit val: 7 and index in DB: 153 string in DB qkamhurktr |
edit val: 7 and index in DB: 263 string in DB jjnehrykxj |
edit val: 7 and index in DB: 617 string in DB emnhpgyict |
edit val: 7 and index in DB: 636 string in DB vkmmwpgplj |
edit val: 7 and index in DB: 790 string in DB gpmhhdqabs |
```

```
edit val: 5 and index in DB: 1029 string in DB owmnlqaezf |
edit val: 7 and index in DB: 10 string in DB xtlsгыpsfa |
edit val: 7 and index in DB: 184 string in DB rfsuqhces |
edit val: 7 and index in DB: 469 string in DB ycmwfyaaqi |
edit val: 7 and index in DB: 540 string in DB xavdqamnfh |
edit val: 7 and index in DB: 773 string in DB idzyqazfno |
edit val: 7 and index in DB: 790 string in DB gpmhhdqabs |
edit val: 7 and index in DB: 849 string in DB fufxyaaaym |
edit val: 7 and index in DB: 904 string in DB xlaeykexqg |
edit val: 7 and index in DB: 1194 string in DB vwoqyvjvkh |
```

Select Microsoft Visual Studio Debug Console

```
edit val: 6 and index in DB: 4564 string in DB cwvarzszbs |
edit val: 6 and index in DB: 7606 string in DB hufutcszks |
edit val: 6 and index in DB: 8900 string in DB usuqaailbw |
edit val: 7 and index in DB: 227 string in DB ufarzrosdq |
edit val: 7 and index in DB: 369 string in DB sufahyyayz |
edit val: 7 and index in DB: 616 string in DB zifawftzgg |
edit val: 7 and index in DB: 711 string in DB uuhtainkeb |
edit val: 7 and index in DB: 729 string in DB ccpaowazfe |
edit val: 7 and index in DB: 881 string in DB faveopszrn |
```

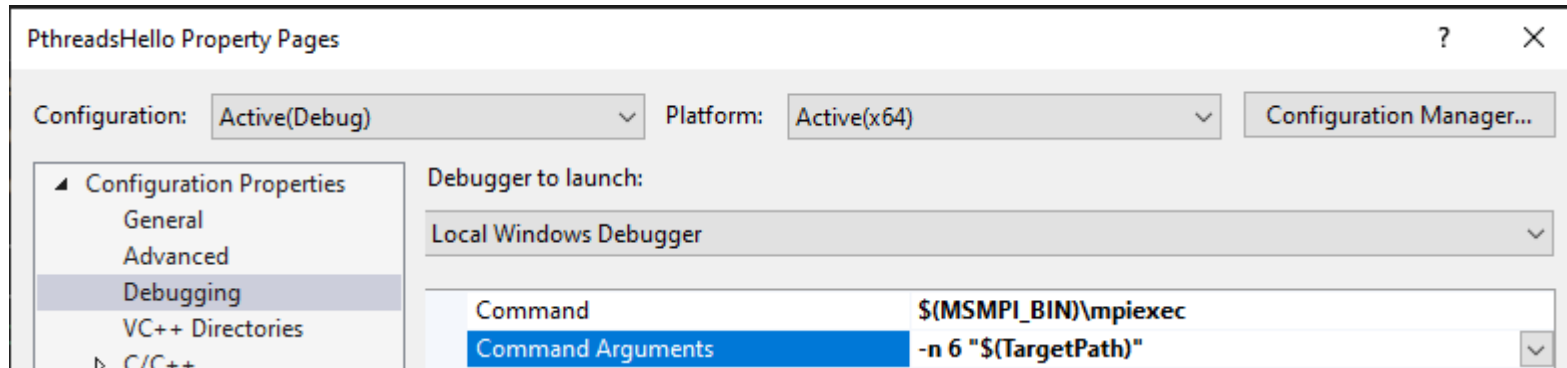
```
edit val: 5 and index in DB: 2359 string in DB hbybdyruxh |
edit val: 6 and index in DB: 2761 string in DB fhjrhyltqz |
edit val: 6 and index in DB: 3183 string in DB dhgptwiqfm |
edit val: 6 and index in DB: 3771 string in DB uhnbdulnkh |
edit val: 6 and index in DB: 5430 string in DB rhgofciffh |
edit val: 6 and index in DB: 5956 string in DB frkpmftqfxh |
edit val: 6 and index in DB: 7156 string in DB cqgqzyipfh |
edit val: 6 and index in DB: 8417 string in DB fnrwdqiqwy |
edit val: 7 and index in DB: 177 string in DB ugrwniqxd |
edit val: 7 and index in DB: 429 string in DB emgsdymzmm |
```

```
edit val: 5 and index in DB: 6655 string in DB jtcjgfownq |
edit val: 6 and index in DB: 14 string in DB npljvrvipy |
edit val: 6 and index in DB: 714 string in DB jtqnbchlw |
edit val: 6 and index in DB: 1987 string in DB jtoepfovbt |
edit val: 6 and index in DB: 2733 string in DB fzdivtowpf |
edit val: 6 and index in DB: 7065 string in DB jthpjafapy |
edit val: 6 and index in DB: 7123 string in DB ituujrlnicf |
edit val: 6 and index in DB: 8224 string in DB athtaflypf |
edit val: 7 and index in DB: 119 string in DB jtsqjdjootg |
edit val: 7 and index in DB: 137 string in DB vjsjbaoioj |
```

```
edit val: 6 and index in DB: 1461 string in DB jlhbodwxad |
edit val: 6 and index in DB: 4853 string in DB doieriuuecf |
edit val: 6 and index in DB: 6076 string in DB hhdhviudff |
edit val: 6 and index in DB: 6221 string in DB stvtdueuf |
edit val: 6 and index in DB: 7349 string in DB uhxvgcuexm |
edit val: 6 and index in DB: 7520 string in DB uhxoynirea |
edit val: 6 and index in DB: 8879 string in DB ohjkdceuf |
edit val: 7 and index in DB: 0 string in DB phqghumeay |
edit val: 7 and index in DB: 86 string in DB njhaimuczf |
edit val: 7 and index in DB: 123 string in DB spxnvjiupa |
```

8.2”pramter when have 2 comm and 3 process in comm”

make Numcomm=2 and num of process shoud dividable by Numcomm like 6 “doctor tell us this ”



```
int NumComm = 2;
```

8.3-"output when have 2 comm and 3 process in comm"

there are 8 section as I have 8 string in quarry,I show smalist 10 string for every quarry and I show three value in every row of screen

first is the value of edit dectance ,second is index of string in database third is string in database

```
edit val: 5 and index in DB: 1183 string in DB ekrcihhxje |
edit val: 6 and index in DB: 337 string in DB lprgdlwxfa |
edit val: 6 and index in DB: 1501 string in DB qkbyxvofgl |
edit val: 6 and index in DB: 3993 string in DB dskrcqhazpg |
edit val: 6 and index in DB: 5781 string in DB qkrzuvonpl |
edit val: 6 and index in DB: 7727 string in DB bcrcdhyatu |
edit val: 6 and index in DB: 9516 string in DB efrrochoxhi |
edit val: 6 and index in DB: 9644 string in DB hkcydaoxlr |
edit val: 6 and index in DB: 11874 string in DB israydhxca |
edit val: 7 and index in DB: 52 string in DB mhecthlegr |
```

```
edit val: 6 and index in DB: 45 string in DB rtekmqdcyz |
edit val: 6 and index in DB: 4589 string in DB dnprmpkxks |
edit val: 6 and index in DB: 7609 string in DB yntermgkia |
edit val: 6 and index in DB: 7619 string in DB enorhgkfms |
edit val: 6 and index in DB: 8327 string in DB laeldmacyz |
edit val: 6 and index in DB: 11195 string in DB lniimwcfuo |
edit val: 7 and index in DB: 98 string in DB bnefxnxvgz |
edit val: 7 and index in DB: 117 string in DB pnaraewkeg |
edit val: 7 and index in DB: 436 string in DB nlterxbltz |
edit val: 7 and index in DB: 722 string in DB vnyrrpkege |
```

```
edit val: 6 and index in DB: 2397 string in DB enrsxfkrbk |
edit val: 6 and index in DB: 3259 string in DB bkreocnhvw |
edit val: 6 and index in DB: 4312 string in DB yurkfcnzbn |
edit val: 6 and index in DB: 5244 string in DB twsewrhzbm |
edit val: 6 and index in DB: 5893 string in DB kgexybtzbx |
edit val: 6 and index in DB: 9301 string in DB qtaemunogm |
edit val: 7 and index in DB: 11 string in DB dpooefxzbc |
edit val: 7 and index in DB: 193 string in DB kkvfxxahhjm |
edit val: 7 and index in DB: 377 string in DB qmfevsdcom |
edit val: 7 and index in DB: 401 string in DB ykrxawzadj |
```

```
edit val: 6 and index in DB: 429 string in DB emgsdymzmm |
edit val: 6 and index in DB: 1271 string in DB eahscsnii |
edit val: 6 and index in DB: 8843 string in DB edpsriesle |
edit val: 7 and index in DB: 6 string in DB stmwcsyyc |
edit val: 7 and index in DB: 10 string in DB xtlsgypsfa |
edit val: 7 and index in DB: 457 string in DB bypecjeiww |
edit val: 7 and index in DB: 464 string in DB imofgxeirp |
edit val: 7 and index in DB: 586 string in DB imdspizhwz |
```

```
edit val: 6 and index in DB: 1918 string in DB ldppvytnev |
edit val: 6 and index in DB: 5072 string in DB mzxwvntlad |
edit val: 6 and index in DB: 5684 string in DB blfhvjtlzj |
edit val: 6 and index in DB: 5742 string in DB wxovlsdleu |
edit val: 6 and index in DB: 6754 string in DB erxvorlwej |
edit val: 6 and index in DB: 9074 string in DB ndxleflcej |
edit val: 6 and index in DB: 9793 string in DB iaaovvtjew |
edit val: 6 and index in DB: 10013 string in DB suapvklujj |
edit val: 6 and index in DB: 11025 string in DB eehobktlix |
edit val: 7 and index in DB: 89 string in DB abfcvkdez |
```

```
edit val: 6 and index in DB: 4695 string in DB fcnsnuyjnf |
edit val: 6 and index in DB: 5353 string in DB fuoyndqvif |
edit val: 6 and index in DB: 9683 string in DB yasrnumdnr |
edit val: 6 and index in DB: 10795 string in DB fmyrndxnas |
edit val: 6 and index in DB: 11799 string in DB foepskqinx |
edit val: 7 and index in DB: 185 string in DB kmkhssmyno |
edit val: 7 and index in DB: 213 string in DB fmowgrgonu |
edit val: 7 and index in DB: 612 string in DB ikvpaudvkv |
edit val: 7 and index in DB: 709 string in DB msdbuhvhfq |
edit val: 7 and index in DB: 813 string in DB fojswrqcnb |
```

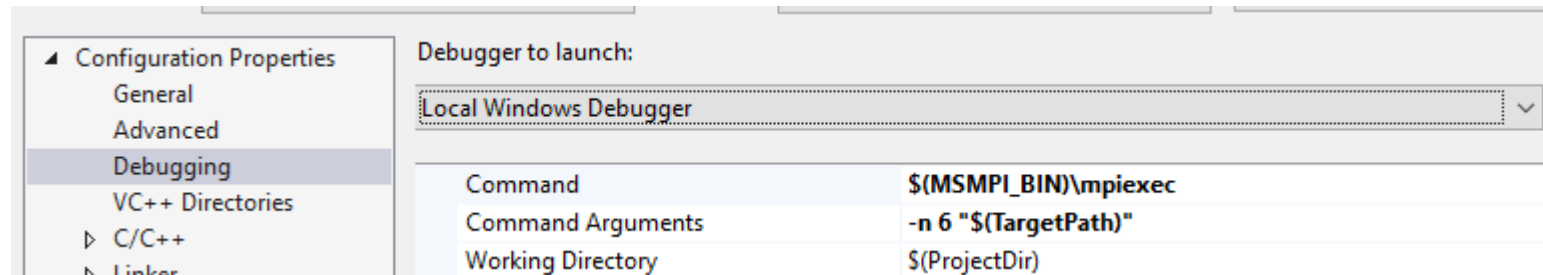
```
edit val: 6 and index in DB: 1631 string in DB zeycqwxlln |
edit val: 6 and index in DB: 3901 string in DB rpimtwxxyf |
edit val: 6 and index in DB: 4587 string in DB traxtkwlum |
edit val: 6 and index in DB: 4852 string in DB alitswcwxx |
edit val: 6 and index in DB: 7036 string in DB liplwuxaln |
edit val: 6 and index in DB: 9129 string in DB nwnvxdxldn |
edit val: 6 and index in DB: 10737 string in DB rlqtkllyhq |
edit val: 7 and index in DB: 169 string in DB vobtwxhgin |
edit val: 7 and index in DB: 326 string in DB alwnksvloj |
edit val: 7 and index in DB: 436 string in DB nlterxbltz |
```

```
edit val: 6 and index in DB: 605 string in DB kkouxdcynk |
edit val: 6 and index in DB: 1788 string in DB knhuifjuuz |
edit val: 6 and index in DB: 1905 string in DB ffovyffkmz |
edit val: 6 and index in DB: 2093 string in DB kzoqhzyuzz |
edit val: 6 and index in DB: 7683 string in DB kzuyofjoky |
edit val: 6 and index in DB: 8618 string in DB kfobufakln |
edit val: 6 and index in DB: 9125 string in DB ooujwbyolz |
edit val: 6 and index in DB: 10978 string in DB kepcuffaop |
```

8.4”pramter when have 3 comm and 3 process in comm”
make Numcomm=3 and num of process shoud dividable by
Numcomm like 6 “doctor tell us this ”

```
int NumComm = 3;
```

```
int Qn = 9; /*-----have 8 string in qyaery ----*/  
int Nn = 12000; /*-----have 100000 string in DB----*/
```



8.5-"output when have 3 comm and 2 process in comm"

there are 9 section as I have 9 string in quarry,I show smalist 10 string for every quarry and I show three value in every row of screen

first is the value of edit dectance ,second is index of string in database third is string in database

```
Microsoft Visual Studio Debug Console

edit val: 6 and index in DB: 1631 string in DB zeycqwlln |
edit val: 6 and index in DB: 3901 string in DB rpimtwxyf |
edit val: 6 and index in DB: 4587 string in DB traxtkwlum |
edit val: 6 and index in DB: 4852 string in DB alitswckwx |
edit val: 6 and index in DB: 7036 string in DB liplwuxaln |
edit val: 6 and index in DB: 9129 string in DB nwnvxdxldn |
edit val: 6 and index in DB: 10737 string in DB rlgtklyyhq |
edit val: 7 and index in DB: 169 string in DB vobtwxhgin |
edit val: 7 and index in DB: 326 string in DB alwnksvloi |
edit val: 7 and index in DB: 436 string in DB nlterxbltz |

edit val: 6 and index in DB: 605 string in DB kkouxdcynk |
edit val: 6 and index in DB: 1788 string in DB knhuifjuuz |
edit val: 6 and index in DB: 1905 string in DB ffovyffkmz |
edit val: 6 and index in DB: 2093 string in DB kzoqhzuyzz |
edit val: 6 and index in DB: 7683 string in DB kzuyofjoky |
edit val: 6 and index in DB: 8618 string in DB kfobufakln |
edit val: 6 and index in DB: 9125 string in DB ooujwbyolz |
edit val: 6 and index in DB: 10978 string in DB kepcuffaop |
edit val: 6 and index in DB: 11778 string in DB qlourkcyok |
edit val: 7 and index in DB: 25 string in DB eiojwayyyp |

edit val: 6 and index in DB: 7683 string in DB kzuyofjoky |
edit val: 6 and index in DB: 8618 string in DB kfobufakln |
edit val: 6 and index in DB: 9125 string in DB ooujwbyolz |
edit val: 6 and index in DB: 10978 string in DB kepcuffaop |
edit val: 6 and index in DB: 11778 string in DB qlourkcyok |
edit val: 7 and index in DB: 6250 string in DB miuyyyuyoo |
edit val: 7 and index in DB: 6308 string in DB kznflpomor |
edit val: 7 and index in DB: 6395 string in DB zsqedagyz |
edit val: 7 and index in DB: 6679 string in DB zxcxyfjxor |
edit val: 7 and index in DB: 6815 string in DB rkofatyosu |

edit val: 5 and index in DB: 1183 string in DB ekrcihhxje |
edit val: 6 and index in DB: 337 string in DB lprgdwxfa |
edit val: 6 and index in DB: 1501 string in DB qkbyxvofgl |
edit val: 6 and index in DB: 3993 string in DB dskrcqhzipg |
edit val: 6 and index in DB: 5781 string in DB qkrzuvonpl |
edit val: 6 and index in DB: 7727 string in DB bcrcdhyatu |
edit val: 6 and index in DB: 9516 string in DB efrnchoxhi |
edit val: 6 and index in DB: 9644 string in DB hkcydaoxlr |
edit val: 6 and index in DB: 11874 string in DB israydhxca |
edit val: 7 and index in DB: 52 string in DB mhecthlegr |

edit val: 6 and index in DB: 4589 string in DB dnprmpkxks |
edit val: 6 and index in DB: 7609 string in DB yntermgkia |
edit val: 6 and index in DB: 7619 string in DB enorhgkfms |
edit val: 6 and index in DB: 8327 string in DB laeldmacyz |
edit val: 6 and index in DB: 11195 string in DB lniimwcfuo |
edit val: 7 and index in DB: 98 string in DB bnfxnxvgz |
edit val: 7 and index in DB: 117 string in DB pnaraewkeg |
edit val: 7 and index in DB: 436 string in DB nlterxbltz |
edit val: 7 and index in DB: 722 string in DB vnyrrpkege |

edit val: 6 and index in DB: 7609 string in DB yntermgkia |
edit val: 6 and index in DB: 7619 string in DB enorhgkfms |
edit val: 6 and index in DB: 8327 string in DB laeldmacyz |
edit val: 6 and index in DB: 11195 string in DB lniimwcfuo |
edit val: 7 and index in DB: 6070 string in DB kijndwbcjz |
edit val: 7 and index in DB: 6289 string in DB yneaqsicle |
edit val: 7 and index in DB: 6362 string in DB lnicuwonav |
edit val: 7 and index in DB: 6462 string in DB malrmwvfvf |
edit val: 7 and index in DB: 6687 string in DB aqnrpmxkme |
edit val: 7 and index in DB: 6711 string in DB aqektbcbwz |

edit val: 6 and index in DB: 429 string in DB emgsdymzmm |
edit val: 6 and index in DB: 1271 string in DB eahscsnsii |
edit val: 6 and index in DB: 8843 string in DB edpsriesle |
edit val: 7 and index in DB: 6 string in DB stmwcsysyc |
edit val: 7 and index in DB: 10 string in DB xtlsygypsfa |
edit val: 7 and index in DB: 457 string in DB bypecjeiww |
edit val: 7 and index in DB: 464 string in DB imofgxeirp |
edit val: 7 and index in DB: 586 string in DB imdspizhwz |
edit val: 7 and index in DB: 606 string in DB htosfytluc |
edit val: 7 and index in DB: 776 string in DB rjscyoeivd |

edit val: 6 and index in DB: 1918 string in DB ldppvytnev |
edit val: 6 and index in DB: 5072 string in DB mzxwvntlad |
edit val: 6 and index in DB: 5684 string in DB blfhvjtlzj |
edit val: 6 and index in DB: 5742 string in DB wxovlsdleu |
edit val: 6 and index in DB: 6754 string in DB erxvorlwej |
edit val: 6 and index in DB: 9074 string in DB ndxleflcej |
edit val: 6 and index in DB: 9793 string in DB iaaovvtjew |
edit val: 6 and index in DB: 10013 string in DB suapvklujj |
edit val: 6 and index in DB: 11025 string in DB eehobktlix |
edit val: 7 and index in DB: 89 string in DB abfcvkddez |

edit val: 6 and index in DB: 6754 string in DB erxvorlwej |
edit val: 6 and index in DB: 9074 string in DB ndxleflcej |
edit val: 6 and index in DB: 9793 string in DB iaaovvtjew |
edit val: 6 and index in DB: 10013 string in DB suapvklujj |
edit val: 6 and index in DB: 11025 string in DB eehobktlix |
edit val: 7 and index in DB: 6023 string in DB rtxqvetzfi |
edit val: 7 and index in DB: 6041 string in DB skowvzglpw |
edit val: 7 and index in DB: 6274 string in DB wpynvcktge |
edit val: 7 and index in DB: 6374 string in DB mdlplituhj |
edit val: 7 and index in DB: 6377 string in DB drsonatllz |
```