NORTH WESTERN UNIVERSITY, KHULNA



Course Title: Artificial Intelligence and Expert Systems Sessional

Course Code: CSE-3302

Lab Report

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| **Submitted by:**  Name: Sajib Bhattacharjee  Id: 20201070010  Department of Computer Science and Engineering.  North Western University, Khulna. | **Submitted to:**  Tajul Islam  Department Head  Department of Computer Science and Engineering.  North Western University, Khulna. |

**Submission Date:25.01.2023** **Teacher’s Signature**

**1. Algorithm Name: Breadth-First Search(BFS).**

**Description:** The breadth-first search (BFS) algorithm is used to search a tree or graph data structure for a node that meets a set of criteria. It starts at the tree’s root or graph and searches/visits all nodes at the current depth level before moving on to the nodes at the next depth level. Breadth-first search can be used to solve many problems in graph theory.

**#Code Implementation using C-Programming:**

#include<stdio.h>

#include<conio.h>

/\*

Naming Convention-->

Name: Sajib Kumar

s = s\_forMatrixArray,

a = a\_forQuee,

j = j\_forVisitedArray,

i = i\_forNumberOfVartex,

b = b\_forLoop,

k = k\_forNastedLoop,

u = f\_forFront,

m = m\_forRare

\*/

int s\_forMatrixArray[20][20], a\_forQuee[20], j\_forVisitedArray[20], i\_forNumberOfVartex, b\_forLoop, k\_forNastedLoop, u\_forFront= 0, m\_forRare = -1;

void sajib\_forBFS(int vertex)

{

for(b\_forLoop = 1; b\_forLoop <= i\_forNumberOfVartex; b\_forLoop ++)

if(s\_forMatrixArray[vertex][b\_forLoop] && !j\_forVisitedArray[b\_forLoop])

a\_forQuee[++m\_forRare] = b\_forLoop;

if(u\_forFront <= m\_forRare)

{

j\_forVisitedArray[a\_forQuee[u\_forFront]] = 1;

sajib\_forBFS(a\_forQuee[u\_forFront++]);

}

}

void main()

{

printf("\t\t\t\t Hay Welcome...!");

printf("\n\t\t\t Breadth First Search(BFS)\n\n");

char name[200] = "Sajib Bhattacharjee";

printf("\nEnter the number of Vertex: ");

scanf("%d",&i\_forNumberOfVartex);

for(b\_forLoop=1; b\_forLoop <= i\_forNumberOfVartex; b\_forLoop++)

{

a\_forQuee[b\_forLoop] = 0;

j\_forVisitedArray[b\_forLoop] = 0;

}

printf("\nEnter graph data in matrix form:\n");

for(b\_forLoop=1; b\_forLoop<=i\_forNumberOfVartex; b\_forLoop++)

{

for(k\_forNastedLoop=1; k\_forNastedLoop<=i\_forNumberOfVartex; k\_forNastedLoop++)

{

scanf("%d",&s\_forMatrixArray[b\_forLoop][k\_forNastedLoop]);

}

}

int vertex;

printf("\nEnter the starting vertex:");

scanf("%d", &vertex);

sajib\_forBFS(vertex);

printf("\nThe node which are reachable are: \n");

for(b\_forLoop=1; b\_forLoop <= i\_forNumberOfVartex; b\_forLoop++)

{

if(j\_forVisitedArray[b\_forLoop])

printf("%d\t", b\_forLoop);

else

{

printf("\nBFS is not possible. Not all nodes are reachable....\n");

printf("Please Try Again...!!!");

break;

}

}

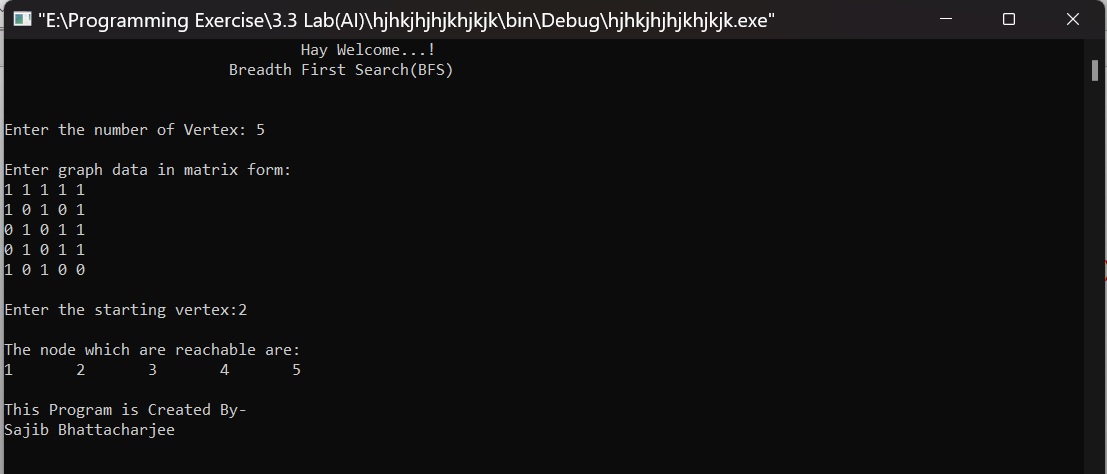
printf("\n\nThis Program is Created By- \n");

printf("%s",name);;

getch();

}

**Input & Output:**

****

**2. Algorithm Name: Depth-First Search(DFS).**

**Description:** Depth-first search is an algorithm for traversing or searching tree or graph data structures. The algorithm starts at the root node (selecting some arbitrary node as the root node in the case of a graph) and explores as far as possible along each branch before backtracking.

So, the basic idea is to start from the root or any arbitrary node , mark the node, move to the adjacent unmarked node, and continue this loop until there is no unmarked adjacent node. Then backtrack and check for other unmarked nodes and traverse them. Finally, print the nodes in the path.

**#Code Implementation using C-Programming:**

#include<stdio.h>

#include<conio.h>

/\*

Naming Convention.

sajib kumar

s = s\_forAdjacencyMatrix,

a = a\_forQuee,

j = j\_forNumberOfVartex,

i = i\_forLoop,

b = b\_forNastedLoop,

k = k\_forCount,

\*/

int s\_forAdjacencyMatrix[20][20],a\_forQuee[20],j\_forNumberOfVartex,i\_forLoop , b\_forNastedLoop;

void sajib\_forDFS(int v)

{

a\_forQuee[v]=1;

for(i\_forLoop=1; i\_forLoop<=j\_forNumberOfVartex; i\_forLoop++)

if(s\_forAdjacencyMatrix[v][i\_forLoop] && !a\_forQuee[i\_forLoop])

{

printf("\n %d->%d",v,i\_forLoop);

sajib\_forDFS(i\_forLoop);

}

}

void main()

{

int k\_forCount=0;

//clrscr();

printf("\nEnter number of vertices:");

scanf("%d",&j\_forNumberOfVartex);

for(i\_forLoop=1; i\_forLoop<=j\_forNumberOfVartex; i\_forLoop++)

{

a\_forQuee[i\_forLoop]=0;

for(b\_forNastedLoop=1; b\_forNastedLoop<=j\_forNumberOfVartex; b\_forNastedLoop++)

s\_forAdjacencyMatrix[i\_forLoop][b\_forNastedLoop]=0;

}

printf("\nEnter the adjacency matrix:\n");

for(i\_forLoop=1; i\_forLoop<=j\_forNumberOfVartex; i\_forLoop++)

for(b\_forNastedLoop=1; b\_forNastedLoop<=j\_forNumberOfVartex; b\_forNastedLoop++)

scanf("%d",&s\_forAdjacencyMatrix[i\_forLoop][b\_forNastedLoop]);

sajib\_forDFS(1);

printf("\n");

for(i\_forLoop=1; i\_forLoop<=j\_forNumberOfVartex; i\_forLoop++)

{

if(a\_forQuee[i\_forLoop])

k\_forCount++;

}

if(k\_forCount==j\_forNumberOfVartex)

printf("\n Graph is connected");

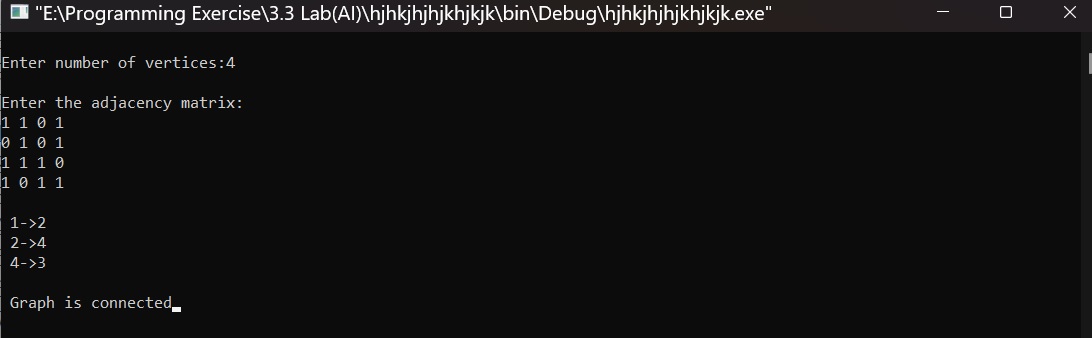
else

printf("\n Graph is not connected");

getch();

}

**Input & Output:**



**3. Algorithm Name: Uniform-Cost Search(UCS).**

**Description:** Uniform-cost search is a searching algorithm used for traversing a weighted tree or graph. This algorithm comes into play when a different cost is available for each edge. The primary goal of the uniform-cost search is to find a path to the goal node which has the lowest cumulative cost. Uniform-cost search expands nodes according to their path costs from the root node. It can be used to solve any graph/tree where the optimal cost is in demand. A uniform-cost search algorithm is implemented by the priority queue. It gives maximum priority to the lowest cumulative cost. A uniform cost search is equivalent to a BFS algorithm if the path cost of all edges is the same.

**#Code Implementation using C++:**

#include <iostream>

#include <queue>

#include <vector>

using namespace std;

const int MAX = 100;

int cost[MAX][MAX], dist[MAX], parent[MAX];

bool visited[MAX];

int n;

struct Node {

int vertex;

int distance;

bool operator<(const Node& other) const {

return distance > other.distance;

}

};

void ucs(int start) {

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

dist[i] = INT\_MAX;

visited[i] = false;

}

priority\_queue<Node> q;

dist[start] = 0;

q.push({start, 0});

while (!q.empty()) {

int u = q.top().vertex;

q.pop();

if (visited[u]) {

continue;

}

visited[u] = true;

for (int v = 0; v < n; v++) {

if (cost[u][v] != INT\_MAX && dist[u] + cost[u][v] < dist[v]) {

dist[v] = dist[u] + cost[u][v];

parent[v] = u;

q.push({v, dist[v]});

}

}

}

}

int main() {

cin >> n;

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

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

cin >> cost[i][j];

}

}

int start;

cin >> start;

ucs(start);

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

cout << i << " " << dist[i] << endl;

}

return 0;

}

**Input & Output:**

**4. Algorithm Name: Genetic Algorithms(GAs)**

Description: Genetic Algorithms(GAs) are adaptive heuristic search algorithms that belong to the larger part of evolutionary algorithms. Genetic algorithms are based on the ideas of natural selection and genetics. These are intelligent exploitation of random searches provided with historical data to direct the search into the region of better performance in solution space. They are commonly used to generate high-quality solutions for optimization problems and search problems.

Genetic algorithms simulate the process of natural selection which means those species that can adapt to changes in their environment are able to survive and reproduce and go to the next generation. In simple words, they simulate “survival of the fittest” among individuals of consecutive generations for solving a problem. Each generation consists of a population of individuals and each individual represents a point in search space and a possible solution. Each individual is represented as a string of characters/integers/floats/bits. This string is analogous to the Chromosome.

**#Code Implementation using C++:**

#include <bits/stdc++.h>

using namespace std;

#define POPULATION\_SIZE 100

const string nam = "abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOP"\

"QRSTUVWXYZ 1234567890, .-;:\_!\"#%&/()=?@${[]}";

const string Target\_nam= "I am Imon";

int random\_num(int start, int end)

{

int range = (end-start)+1;

int random\_int = start+(rand()%range);

return random\_int;

}

char mutated\_nam()

{

int len = nam.size();

int r = random\_num(0, len-1);

return nam[r];

}

string create\_gnome()

{

int len = Target\_nam.size();

string gnome = "";

for(int i = 0;i<len;i++)

gnome += mutated\_nam();

return gnome;

}

class Individual

{

public:

string chromosome;

int fitness;

Individual(string chromosome);

Individual mate(Individual parent2);

int cal\_fitness();

};

Individual::Individual(string chromosome)

{

this->chromosome = chromosome;

fitness = cal\_fitness();

};

Individual Individual::mate(Individual par2)

{

string child\_chromosome = "";

int len = chromosome.size();

for(int i = 0;i<len;i++)

{

float p = random\_num(0, 100)/100;

if(p < 0.45)

child\_chromosome += chromosome[i];

else if(p < 0.90)

child\_chromosome += par2.chromosome[i];

else

child\_chromosome += mutated\_nam();

}

return Individual(child\_chromosome);

};

int Individual::cal\_fitness()

{

int len = Target\_nam.size();

int fitness = 0;

for(int i = 0;i<len;i++)

{

if(chromosome[i] != Target\_nam[i])

fitness++;

}

return fitness;

};

bool operator<(const Individual &ind1, const Individual &ind2)

{

return ind1.fitness < ind2.fitness;

}

int main()

{

srand((unsigned)(time(0)));

int generation = 0;

vector<Individual> population;

bool found = false;

for(int i = 0;i<POPULATION\_SIZE;i++)

{

string gnome = create\_gnome();

population.push\_back(Individual(gnome));

}

while(! found)

{

sort(population.begin(), population.end());

if(population[0].fitness <= 0)

{

found = true;

break;

}

vector<Individual> new\_generation;

int s = (10\*POPULATION\_SIZE)/100;

for(int i = 0;i<s;i++)

new\_generation.push\_back(population[i]);

s = (90\*POPULATION\_SIZE)/100;

for(int i = 0;i<s;i++)

{

int len = population.size();

int r = random\_num(0, 50);

Individual parent1 = population[r];

r = random\_num(0, 50);

Individual parent2 = population[r];

Individual offspring = parent1.mate(parent2);

new\_generation.push\_back(offspring);

}

population = new\_generation;

cout<< "Generation: " << generation << "\t";

cout<< "String: "<< population[0].chromosome <<"\t";

cout<< "Fitness: "<< population[0].fitness << "\n";

generation++;

}

cout<< "Generation: " << generation << "\t";

cout<< "String: "<< population[0].chromosome <<"\t";

cout<< "Fitness: "<< population[0].fitness << "\n";

}

**Output:**

Generation: 0 String: PDan\_SAu(Z Fitness: 8

Generation: 1 String: PDan\_SAu(Z Fitness: 8

Generation: 2 String: PDan\_SAu(Z Fitness: 8

Generation: 3 String: PDan\_SAu(Z Fitness: 8

Generation: 4 String: PDan\_SAu(Z Fitness: 8

Generation: 5 String: PDan\_SAu(Z Fitness: 8

Generation: 6 String: PDan\_SAu(Z Fitness: 8

Generation: 7 String: PDan\_SAu(Z Fitness: 8

Generation: 8 String: PDan\_SAu(Z Fitness: 8

Generation: 9 String: )Dan\_SAu(0 Fitness: 8

Generation: 10 String: )Dan\_SAu(0 Fitness: 8

Generation: 11 String: PDan\_SAuJZ Fitness: 8

Generation: 12 String: PDan$SAu(Z Fitness: 8

Generation: 13 String: PDan\_SAu(Z Fitness: 8

Generation: 14 String: PDan\_SAu(Z Fitness: 8

Generation: 15 String: )Dan\_SAu(0 Fitness: 8

Generation: 16 String: );an\_SAu(0 Fitness: 8

Generation: 17 String: PDan$SAu(Z Fitness: 8

Generation: 18 String: PDan@SAu(Z Fitness: 8

Generation: 19 String: PDan$SAu(Z Fitness: 8

Generation: 20 String: PDan@SAu(Z Fitness: 8

Generation: 21 String: PDan@SAu(Z Fitness: 8

Generation: 22 String: PDan$SAu(Z F

Generation: 29 String: PDan$SAh(Z Fitness: 8

Generation: 30 String: PDa)@SAu(Z Fitness: 8

Generation: 31 String: PDan$SAuiZ Fitness: 7

Generation: 32 String: PDan$SAuiZ Fitness: 7

Generation: 33 String: PDan$SAuiZ Fitness: 7

Generation: 34 String: PDan$SAuiZ Fitness: 7

Generation: 35 String: PDan$SAuiZ Fitness: 7

Generation: 36 String: PDan$SAuiZ Fitness: 7

Generation: 37 String: PDan$SAuiZ Fitness: 7

Generation: 38 String: PDan$SauiZ Fitness: 6

Generation: 39 String: PDan$SauiZ Fitness: 6

Generation: 40 String: PDan$SauiZ Fitness: 6

Generation: 41 String: PDan$SauiZ Fitness: 6

Generation: 42 String: PDan$SauiZ Fitness: 6

Generation: 43 String: PDan$SauiZ Fitness: 6

Generation: 44 String: PDay$SauiZ Fitness: 6

Generation: 45 String: PDan$SauiZ Fitness: 6

Generation: 46 String: PDan$SauiZ Fitness: 6

Generation: 47 String: PDan$SauiZ Fitness: 6

Generation: 48 String: PDan$SauiZ Fitness: 6

Generation: 49 String: PDan$SaSiZ Fitness: 6

Generation: 50 String: PDan$SauiZ Fitness: 6

Generation: 51 String: PDan$SauiZ Fitness: 6

Generation: 52 String: PDan$SauiZ Fitness: 6

Generation: 53 String: PDan$SauiZ Fitness: 6

Generation: 54 String: PDan$SauiZ Fitness: 6

Generation: 55 String: PDan$SauiZ Fitness: 6

Generation: 56 String: PDan$SauiZ Fitness: 6

Generation: 57 String: PDan$SauiZ Fitness: 6 Generation: 29 String: PDan$SaZif Fitness: 6

Generation: 59 String: PDan$SauiZ Fitness: 6

Generation: 60 String: P%an$SauiZ Fitness: 6

Generation: 61 String: P%an$SauiZ Fitness: 6

Generation: 62 String: PDan$SaZif Fitness: 6

Generation: 63 String: PDan$SauiZ Fitness: 6

Generation: 64 String: PDan SauiZ Fitness: 5

Generation: 65 String: PDan SauiZ Fitness: 5

Generation: 66 String: PDan SauiZ Fitness: 5

Generation: 67 String: PDan SauiZ Fitness: 5

Generation: 68 String: PDan SauiZ Fitness: 5

Generation: 69 String: PDan SauiZ Fitness: 5

Generation: 70 String: hDan SauiZ Fitness: 5

Generation: 71 String: P%an SauiZ Fitness: 5

Generation: 72 String: PDan SauiZ Fitness: 5

Generation: 73 String: PDan SauiZ Fitness: 5

Generation: 74 String: PDan SawiZ Fitness: 5

Generation: 75 String: PDan SauiZ Fitness: 5

Generation: 76 String: PDan SawiZ Fitness: 5

Generation: 77 String: PDan SawiZ Fitness: 5

Generation: 78 String: PMan SauiZ Fitness: 5

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Generation: 80 String: PDan Sauiy Fitness: 5

Generation: 81 String: Dan SauiZ Fitness: 5

Generation: 82 String: PDan SauiZ Fitness: 5

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Generation: 84 String: Dan SauiZ Fitness: 5

Generation: 85 String: PDan Sauif Fitness: 5

Generation: 86 String: PDan Sauiy Fitness: 5

Generation: 87 String: 5Dan SauiZ Fitness: 5

Generation: 88 String: PDan SauiZ Fitness: 5

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Generation: 92 String: PDan SauiZ Fitness: 5

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Generation: 96 String: PDan SauiZ Fitness: 5

Generation: 97 String: PDan SauiZ Fitness: 5

Generation: 98 String: PDan SauiZ Fitness: 5

Generation: 99 String: PDan SauiZ Fitness: 5

Generation: 100 String: PDan SauiZ Fitness: 5

Generation: 101 String: Phan SauiZ Fitness: 5

Generation: 102 String: P#an SauiX Fitness: 5

Generation: 103 String: PEan Saui- Fitness: 5

Generation: 104 String: P#an SauiX Fitness: 5

Generation: 105 String: P=an Saui- Fitness: 5

Generation: 106 String: PEan Saui- Fitness: 5

Generation: 107 String: PDan SauiZ Fitness: 5

Generation: 108 String: P#an SauiX Fitness: 5

Generation: 109 String: P?an SauiZ Fitness: 5

Generation: 110 String: PEan Saui- Fitness: 5

Generation: 111 String: PDan SauiZ Fitness: 5

Generation: 112 String: Phan Saui@ Fitness: 5

Generation: 113 String: PDan Sa/iZ Fitness: 5

Generation: 114 String: PDan SauiZ Fitness: 5

Generation: 115 String: (Dan SauiZ Fitness: 5

Generation: 116 String: P an SauiZ Fitness: 4

Generation: 117 String: P an SauiZ Fitness: 4

Generation: 118 String: P an SauiZ Fitness: 4

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Generation: 166 String: P an Sa}ib Fitness: 3

Generation: 167 String: P an Sa4ib Fitness: 3

Generation: 168 String: P an Sa}ib Fitness: 3

Generation: 169 String: 5 an Sa}ib Fitness: 3

Generation: 170 String: P an Sa}ib Fitness: 3

Generation: 171 String: P an Sa}ib Fitness: 3

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Generation: 200 String: \_ am Sa}ib Fitness: 2

Generation: 201 String: \_ am Sa}ib Fitness: 2

Generation: 202 String: \_ am Sa}ib Fitness: 2

Generation: 203 String: \_ am Sa}ib Fitness: 2

Generation: 204 String: \_ am Sa}ib Fitness: 2

Generation: 205 String: h am Sa!ib Fitness: 2

Generation: 206 String: \_ am Sa}ib Fitness: 2

Generation: 207 String: \_ am Sa}ib Fitness: 2

Generation: 208 String: \_ am Sa}ib Fitness: 2

Generation: 209 String: y am Sa}ib Fitness: 2

Generation: 210 String: \_ am Sa}ib Fitness: 2

Generation: 211 String: h am Sahib Fitness: 2

Generation: 212 String: \_ am Sa}ib Fitness: 2

Generation: 213 String: \_ am Sa}ib Fitness: 2

Generation: 214 String: \_ am Sa}ib Fitness: 2

Generation: 215 String: h am Sa!ib Fitness: 2

Generation: 216 String: h am Sa!ib Fitness: 2

Generation: 217 String: \_ am Sa}ib Fitness: 2

Generation: 218 String: \_ am Sa}ib Fitness: 2

Generation: 219 String: h am Sa!ib Fitness: 2

Generation: 220 String: h am Sa!ib Fitness: 2

Generation: 221 String: \_ am Sa}ib Fitness: 2

Generation: 222 String: \_ am Sa}ib Fitness: 2

Generation: 223 String: \_ am Sa}ib Fitness: 2

Generation: 224 String: h am Sa!ib Fitness: 2

Generation: 225 String: \_ am Sa}ib Fitness: 2

Generation: 226 String: \_ am Sa}ib Fitness: 2

Generation: 227 String: o am Sa}ib Fitness: 2

Generation: 228 String: \_ am Sa}ib Fitness: 2

Generation: 229 String: A am Sa}ib Fitness: 2

Generation: 230 String: \_ am SaFib Fitness: 2

Generation: 231 String: k am Sa!ib Fitness: 2

Generation: 232 String: k am Sa!ib Fitness: 2

Generation: 233 String: l am SaFib Fitness: 2

Generation: 234 String: \_ am Sa}ib Fitness: 2

Generation: 235 String: l am SaFib Fitness: 2

Generation: 236 String: \_ am SaFib Fitness: 2

Generation: 237 String: o am Sa}ib Fitness: 2

Generation: 238 String: h am Sa!ib Fitness: 2

Generation: 239 String: o am Sa}ib Fitness: 2

Generation: 240 String: h am Sa!ib Fitness: 2

Generation: 241 String: h am Sa!ib Fitness: 2

Generation: 242 String: o am Sa}ib Fitness: 2

Generation: 243 String: h am Sa!ib Fitness: 2

Generation: 244 String: o am Sa}ib Fitness: 2

Generation: 245 String: \_ am SaFib Fitness: 2

Generation: 246 String: o am Sa}ib Fitness: 2

Generation: 247 String: o am Sa}ib Fitness: 2

Generation: 248 String: h am Sa!ib Fitness: 2

Generation: 249 String: h am Sa!ib Fitness: 2

Generation: 250 String: h am Sa!ib Fitness: 2

Generation: 251 String: o am Sa}ib Fitness: 2

Generation: 252 String: h am Sa!ib Fitness: 2

Generation: 253 String: o am Sa}ib Fitness: 2

Generation: 254 String: o am Sa}ib Fitness: 2

Generation: 255 String: o am Sa}ib Fitness: 2

Generation: 256 String: o am Sa}ib Fitness: 2

Generation: 257 String: h am Sa!ib Fitness: 2

Generation: 258 String: o am Sa}ib Fitness: 2

Generation: 259 String: o am Sa}ib Fitness: 2

Generation: 260 String: r am SaFib Fitness: 2

Generation: 261 String: o am Sa}ib Fitness: 2

Generation: 262 String: o am Sa}ib Fitness: 2

Generation: 263 String: h am Sa!ib Fitness: 2

Generation: 264 String: h am Sa!ib Fitness: 2

Generation: 265 String: H am SaXib Fitness: 2

Generation: 266 String: h am Sa!ib Fitness: 2

Generation: 267 String: H am SaXib Fitness: 2

Generation: 268 String: h am Sa!ib Fitness: 2

Generation: 269 String: h am Sahib Fitness: 2

Generation: 270 String: A am Sa!ib Fitness: 2

Generation: 271 String: o am Sa}ib Fitness: 2

Generation: 272 String: o am Sa}ib Fitness: 2

Generation: 273 String: o am Sa}ib Fitness: 2

Generation: 274 String: t am Sa!ib Fitness: 2

Generation: 275 String: A am Sa!ib Fitness: 2

Generation: 276 String: m am Sa}ib Fitness: 2

Generation: 277 String: o am Sa}ib Fitness: 2

Generation: 278 String: t am Sa!ib Fitness: 2

Generation: 279 String: h am Sahib Fitness: 2

Generation: 280 String: h am Sa!ib Fitness: 2

Generation: 281 String: h am Sahib Fitness: 2

Generation: 282 String: o am Sa}ib Fitness: 2

Generation: 283 String: h am Sahib Fitness: 2

Generation: 284 String: h am Sa7ib Fitness: 2

Generation: 285 String: j am Sahib Fitness: 2

Generation: 286 String: h am Sahib Fitness: 2

Generation: 287 String: j am Sahib Fitness: 2

Generation: 288 String: h am Sahib Fitness: 2

Generation: 289 String: o am Sa}ib Fitness: 2

Generation: 290 String: o am Sa}ib Fitness: 2

Generation: 291 String: t am Sa!ib Fitness: 2

Generation: 292 String: h am Sa7ib Fitness: 2

Generation: 293 String: h am Sahib Fitness: 2

Generation: 294 String: o am Sa}ib Fitness: 2

Generation: 295 String: h am Sahib Fitness: 2

Generation: 296 String: h am Sa!ib Fitness: 2

Generation: 297 String: o am Sa}ib Fitness: 2

Generation: 298 String: o am Sa}ib Fitness: 2

Generation: 299 String: o am Sa}ib Fitness: 2

Generation: 300 String: G am SaPib Fitness: 2

Generation: 301 String: o am Sa}ib Fitness: 2

Generation: 302 String: G am Sa}ib Fitness: 2

Generation: 303 String: h am Sahib Fitness: 2

Generation: 304 String: t am Sa!ib Fitness: 2

Generation: 305 String: G am Sa}ib Fitness: 2

Generation: 306 String: G am Sa}ib Fitness: 2

Generation: 307 String: G am Sa}ib Fitness: 2

Generation: 308 String: f am Sacib Fitness: 2

Generation: 309 String: G am Sa}ib Fitness: 2

Generation: 310 String: G am Sa}ib Fitness: 2

Generation: 311 String: f am Sacib Fitness: 2

Generation: 312 String: G am Sa}ib Fitness: 2

Generation: 313 String: G am Sa}ib Fitness: 2

Generation: 314 String: h am Sahib Fitness: 2

Generation: 315 String: f am Sa}ib Fitness: 2

Generation: 316 String: . am Sa}ib Fitness: 2

Generation: 317 String: f am Sacib Fitness: 2

Generation: 318 String: t am Sa!ib Fitness: 2

Generation: 319 String: f am Sacib Fitness: 2

Generation: 320 String: G am Sajib Fitness: 1

Generation: 321 String: G am Sajib Fitness: 1

Generation: 322 String: G am Sajib Fitness: 1

Generation: 323 String: G am Sajib Fitness: 1

Generation: 324 String: G am Sajib Fitness: 1

Generation: 325 String: G am Sajib Fitness: 1

Generation: 326 String: G am Sajib Fitness: 1

Generation: 327 String: G am Sajib Fitness: 1

Generation: 328 String: G am Sajib Fitness: 1

Generation: 329 String: G am Sajib Fitness: 1

Generation: 330 String: x am Sajib Fitness: 1

Generation: 331 String: G am Sajib Fitness: 1

Generation: 332 String: x am Sajib Fitness: 1

Generation: 333 String: G am Sajib Fitness: 1

Generation: 334 String: G am Sajib Fitness: 1

Generation: 335 String: G am Sajib Fitness: 1

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Generation: 374 String: G am Sajib Fitness: 1

Generation: 375 String: G am Sajib Fitness: 1

Generation: 376 String: G am Sajib Fitness: 1

Generation: 377 String: 7 am Sajib Fitness: 1

Generation: 378 String: { am Sajib Fitness: 1

Generation: 379 String: { am Sajib Fitness: 1

Generation: 380 String: G am Sajib Fitness: 1

Generation: 381 String: G am Sajib Fitness: 1

Generation: 382 String: G am Sajib Fitness: 1

Generation: 383 String: f am Sajib Fitness: 1

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Generation: 389 String: f am Sajib Fitness: 1

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Generation: 391 String: { am Sajib Fitness: 1

Generation: 392 String: 7 am Sajib Fitness: 1

Generation: 393 String: { am Sajib Fitness: 1

Generation: 394 String: f am Sajib Fitness: 1

Generation: 395 String: 0 am Sajib Fitness: 1

Generation: 396 String: G am Sajib Fitness: 1

Generation: 397 String: G am Sajib Fitness: 1

Generation: 398 String: G am Sajib Fitness: 1

Generation: 399 String: G am Sajib Fitness: 1

Generation: 400 String: G am Sajib Fitness: 1

Generation: 401 String: 0 am Sajib Fitness: 1

Generation: 402 String: G am Sajib Fitness: 1

Generation: 403 String: 0 am Sajib Fitness: 1

Generation: 404 String: G am Sajib Fitness: 1

Generation: 405 String: 0 am Sajib Fitness: 1

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Generation: 407 String: { am Sajib Fitness: 1

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Generation: 411 String: G am Sajib Fitness: 1

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Generation: 430 String: s am Sajib Fitness: 1

Generation: 431 String: G am Sajib Fitness: 1

Generation: 432 String: s am Sajib Fitness: 1

Generation: 433 String: G am Sajib Fitness: 1

Generation: 434 String: G am Sajib Fitness: 1

Generation: 435 String: G am Sajib Fitness: 1

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Generation: 437 String: G am Sajib Fitness: 1

Generation: 438 String: G am Sajib Fitness: 1

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Generation: 470 String: G am Sajib Fitness: 1

Generation: 471 String: G am Sajib Fitness: 1

Generation: 472 String: G am Sajib Fitness: 1

Generation: 473 String: G am Sajib Fitness: 1

Generation: 474 String: C am Sajib Fitness: 1

Generation: 475 String: G am Sajib Fitness: 1

Generation: 476 String: G am Sajib Fitness: 1

Generation: 477 String: G am Sajib Fitness: 1

Generation: 478 String: C am Sajib Fitness: 1

Generation: 479 String: C am Sajib Fitness: 1

Generation: 480 String: ? am Sajib Fitness: 1

Generation: 481 String: G am Sajib Fitness: 1

Generation: 482 String: G am Sajib Fitness: 1

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