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|  | | **Finolex Academy of Management and Technology, Ratnagiri** | | | | | | | | | |
| **Department of Information Technology** | | | | | | | | | |
| Subject name: Intelligent System Lab | | | | | | | | Subject Code:ITL703 | | | |
| Class | | BE IT | | Semester – VII (CBCGS) | | | | Academic year: 2018-19 | | | |
| Name of Student | | **Kazi Jawwad A Rahim** | | | | | **QUIZ Score :** | | | | |
| Roll No | | **27** | | | Assignment/Experiment No. | | | | | 01 | |
| Title:  **To implement water jug problem using BFS and DFS.** | | | | | | | | | | | |
|  | | | | | | | | | | | |
| **1. Course objectives applicable:**  **COB2**.Understand the different searching techniques to solve the different AI problems on the basis of knowledge of agent | | | | | | | | | | | |
| **2. Course outcomes applicable:**  **CO2** –Solve the problems based on searching techniques. | | | | | | | | | | | |
| **3. Learning Objectives:**   1. To understand concept of DFS and BFS. 2. To understand water jug problem 3. To program water jug problem for solution no 2 4. To get the output which will give the correct rule applied for required steps | | | | | | | | | | | |
| **4. Practical applications of the assignment/experiment:** Euler circuits,Bioconnected graphs | | | | | | | | | | | |
| **5. Prerequisites**:   1. To learn the use of intelligent agents in uninformed search. 2. To understand the programming methodology for water jug problem. | | | | | | | | | | | |
| **6. Hardware Requirements**:   1. PC with minimum 2GB RAM   **7. Software Requirements:**  1. Windows installed  2. JDK/Net beans | | | | | | | | | | | |
|  | | | | | | | | | | | |
| **8. Quiz Questions (if any): (Online Exam will be taken separately batchwise, attach the certificate/ Marks obtained)**   1. What is AI? 2. What is an Agent? 3. What is PEAS? 4. What is not an Uninformed search technique? | | | | | | | | | | | |
|  | | | | | | | | | | | |
| **9. Experiment/Assignment Evaluation:** | | | | | | | | | | | |
| **Sr. No.** | **Parameters** | | | | | | | | **Marks obtained** | | **Out of** |
| **1** | Technical Understanding (Assessment may be done based on Q & A **or** any other relevant method.) Teacher should mention the other method used - | | | | | | | |  | | 6 |
| **2** | Neatness/presentation | | | | | | | |  | | 2 |
| **3** | Punctuality | | | | | | | |  | | 2 |
| **Date of performance (DOP)** | | |  | | | **Total marks obtained** | | |  | | **10** |
| **Date of checking (DOC)** | | |  | | | **Signature of teacher** | | | | | |

**11. Precautions**:

1. Find all available solution paths and represent it in tree.

2. Define rules and actions applicable for each rule.

**12. Installation Steps / Performance Steps –**

**Program.java**

public class Program

{

public static void main(String args[])

{

WaterJug w = new WaterJug();

w.checkGoal();

}

}

**WaterJug.java**

import java.util.\*;

public class WaterJug

{

int a\_max = 4;

int b\_max = 3;

int a = 0;

int b = 0;

int goal = 2;

void checkGoal()

{

int fin = 0;

while(fin != 1)

{

if((this.a == this.goal) || (this.b == this.goal)) { fin = 1; }

if(this.a==0)

{

fillA();

} else if ((this.a > 0) && (this.b != this.b\_max)) {

transferAtoB();

} else if ((this.a > 0) && (this.b == this.b\_max)) {

emptyB();

}

}

}

void fillA()

{

this.a = this.a\_max;

System.out.println("{" + this.a + "," + this.b + "}");

}

void fillB()

{

this.b = this.b\_max;

System.out.println("{" + this.a + "," + this.b + "}");

}

void transferAtoB()

{

int fin = 0;

while(fin != 1) {

this.b += 1;

this.a -= 1;

if((this.b == this.b\_max) || (this.a == 0)) { fin = 1;}

}

System.out.println("{" + this.a + "," + this.b + "}");

}

void emptyA() {

this.a=0;

System.out.println("{" + this.a + "," + this.b + "}");

}

void emptyB() {

this.b=0;

System.out.println("{" + this.a + "," + this.b + "}");

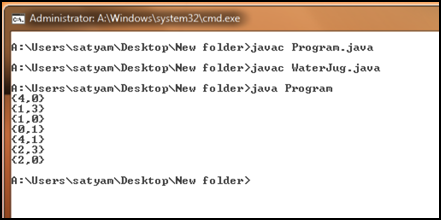
}

}

**13. Observations**

1. The output will give the sequence of nodes to find the solution path or goal node.

**14. Results:**

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**15. Learning Outcomes Achieved**

1. Understanding the concept of uninformed search.
2. Understanding the water jug problem solved by uninformed search technique.

**16. Conclusion:**

1. **Applications of the studied technique in industry**
   1. DFS and BFS algorithms used to develop intelligent systems which solve mathematical problems based on graph.
2. **Engineering Relevance** 
   1. Such algorithms are very useful in searching techniques where number of solutions are more than one.
3. **Skills Developed**
   1. Implementation of BFS for water jug problem.

**17. References** :

[1] G. Görz, C.-R. Rollinger, J. Schneeberger (Hrsg.) “Handbuch der künstlichen

Intelligenz” Oldenbourg Verlag, 2003, Fourth edition

• [2] Turing, A. "Computing Machinery and Intelligence", Mind LIX (236): 433–460,

Ocotober, 1950.

• [3] Aristotle “On Interpretation”, 350 B.C.E, see:

http://classics.mit.edu/Aristotle/interpretation.html

• [4] Newell, A., Simon, H.A. “Human Problem Solving” Englewood Cliffs, N.J.: Prentice

Hall, 1972

• [5] Newell, A. “The Knowledge Level”, AI Magazine 2 (2), 1981, p. 1-20.