

		<b>Finolex Academy of Management and Technology, Ratnagiri</b>	
		<b>Department of Information Technology</b>	
Subject name: Intelligent System Lab			Subject Code:ITL703
Class	BE IT	Semester – VII (CBCGS)	Academic year: 2018-19
Name of Student	<b>Kazi Jawwad A Rahim</b>	<b>QUIZ Score :</b>	
Roll No	<b>27</b>	Assignment/Experiment No.	01
Title: <b>To implement water jug problem using BFS and DFS.</b>			

<b>1. Course objectives applicable: COB2.</b> Understand the different searching techniques to solve the different AI problems on the basis of knowledge of agent
<b>2. Course outcomes applicable:</b> <b>CO2</b> –Solve the problems based on searching techniques.
<b>3. Learning Objectives:</b> <ol style="list-style-type: none"> <li>1. To understand concept of DFS and BFS.</li> <li>2. To understand water jug problem</li> <li>3. To program water jug problem for solution no 2</li> <li>4. To get the output which will give the correct rule applied for required steps</li> </ol>
<b>4. Practical applications of the assignment/experiment:</b> Euler circuits,Bioconnected graphs
<b>5. Prerequisites:</b> <ol style="list-style-type: none"> <li>1. To learn the use of intelligent agents in uninformed search.</li> <li>2. To understand the programming methodology for water jug problem.</li> </ol>
<b>6. Hardware Requirements:</b> <ol style="list-style-type: none"> <li>1. PC with minimum 2GB RAM</li> </ol>
<b>7. Software Requirements:</b> <ol style="list-style-type: none"> <li>1. Windows installed</li> <li>2. JDK/Net beans</li> </ol>

<b>8. Quiz Questions (if any): (Online Exam will be taken separately batchwise, attach the certificate/ Marks obtained)</b> <ol style="list-style-type: none"> <li>1. What is AI?</li> <li>2. What is an Agent?</li> <li>3. What is PEAS?</li> <li>4. What is not an Uninformed search technique?</li> </ol>
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<b>9. Experiment/Assignment Evaluation:</b>			
Sr. No.	Parameters	Marks obtained	Out of
1	Technical Understanding (Assessment may be done based on Q & A <u>or</u> 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:

```

Administrator: A:\Windows\system32\cmd.exe

A:\Users\satyan\Desktop\New folder>javac Program.java
A:\Users\satyan\Desktop\New folder>javac WaterJug.java
A:\Users\satyan\Desktop\New folder>java Program
<4,0>
<1,3>
<1,0>
<0,1>
<4,1>
<2,3>
<2,0>
A:\Users\satyan\Desktop\New folder>

```

### 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

- a. DFS and BFS algorithms used to develop intelligent systems which solve mathematical problems based on graph.

#### 2. Engineering Relevance

- a. Such algorithms are very useful in searching techniques where number of solutions are more than one.

#### 3. Skills Developed

- a. 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, October, 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.