**Introduction to Artificial Intelligence Lab**

**Lab 1: PEAS, environment type, solving a simple problem.**

1. Define PEAS for following agents. Automated taxi?
   * Performance measure: Safe, fast, legal, comfortable,maximize profits
   * Environment: Roads, other traffic, pedestrians, customers
   * Actuators: Steering wheel, accelerator, brake, signal, horn
   * Sensors: Cameras, sonar, speedometer, GPS, odometer,engine sensors, keyboard

Medical diagnosis system?

* + Performance measure: Patient’s health, minimized costs
  + Environment: Patient, hospital
  + Actuators: Questions, test, treatments, examinations
  + Sensors: Symptoms, patient’s answers

Internet shopping agent?

* + Performance measure: Maximize profits, accurate recommendations, efficiency
  + Environment: Shopping sites
  + Actuators: Display to user , links, forms
  + Sensors: HTML pages (text, graphics, scripts)

1. Define type of environment for the following examples.

|  |  |
| --- | --- |
| Crossword puzzle Observable: Fully  Agents: Single  Deterministic: Deterministic  Episodic: Sequential  Static: Static  Discrete: Discrete | Taxi driving  Observable: Partially  Agents: Multi  Deterministic: Stochastic  Episodic: Sequential  Static: Dynamic  Discrete: Continuous |
| English tutor Observable: Partially  Agents: Multi  Deterministic: Stochastic  Episodic: Sequential  Static: Dynamic  Discrete: Discrete | Image analysis Observable: Fully  Agents: Single  Deterministic: Deterministic  Episodic: Episodic  Static: Semi  Discrete: Continuous |

1. Consider the following problem:

**A Water Jug Problem:** You are given two jugs, a 4-gallon one and a 3-gallon one, a pump which has unlimited water which you can use to fill the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug?

* State Representation and Initial State:?
* Goal Predicate:?
* Operators:?
* Solution:?
* Write a program to implement the water jug problem.

Inıtial State: Filling 4-gallon jug.

Goal State: Getting 2 gallons of water.

Goal Predicate:

Operators:

Solution:

4- Gallon 3-Gallon

Jug Jug

1. Fill the 4 gallon jug. (4 gallons) (0 gallon)
2. Pour 4 gallon jug to 3 gallon jug. (1 gallon) (3 gallons)
3. Pour 3 gallon jug to the floor. (1 gallon) (0 gallon)
4. Pour 4 gallon jug to 3 gallon jug. (0 gallon) (1 gallon)
5. Fill the 4 gallon jug. (4 gallons) (1 gallon)
6. Pour 4 gallon jug to 3 gallon jug. (2 gallons) (3 gallons)

Program:

#include <iostream>

#include <stdio.h>

using namespace std;

int main()

{

int fourgallon = 0;

int threegallon = 0;

int input = 0;

int temp = 0;

cin >> input;

if (input == 1)

{

/////////////////////////////////////////// 4 litrelik surahi dolduruldu.

cout << endl;

fourgallon = 4;

cout << "4 litrelik surahi dolduruldu." << endl;

cout << "4 litrelik surahideki Su Miktari:" << fourgallon << endl;

cout << endl;

cout << endl;

/////////////////////////////////////////// 4 litrelik surahi 3 litrelik sürahiye bosaltildi.

threegallon = 3;

temp = threegallon;

threegallon = fourgallon;

if (fourgallon >= 3)

{

threegallon = 3;

}

else

{

threegallon = fourgallon;

}

fourgallon -= temp;

temp = 0;

cout << fourgallon << endl;

cout << "4 litrelik surahi 3 litrelik sürahiye bosaltildi."<< endl;

cout << "4 litrelik surahideki Su Miktari:" << fourgallon << endl;

cout << "3 litrelik surahideki Su Miktari:" << threegallon << endl;

cout << endl;

cout << endl;

/////////////////////////////////////////// 3 litrelik surahideki su yere dokuldu.

threegallon = 0;

cout << "3 litrelik surahideki su yere dokuldu." << endl;

cout << "3 litrelik surahideki Su Miktari:" << threegallon << endl;

cout << endl;

cout << endl;

/////////////////////////////////////////// 4 litrelik surahi 3 litrelik surahiye bosaltildi.

temp = 3 - threegallon;

threegallon = fourgallon;

if (threegallon >> 3)

{

threegallon = 3;

}

else

{

threegallon = fourgallon;

}

fourgallon -= temp;

if (fourgallon <= 0 )

{

fourgallon = 0;

}

temp = 0;

cout << "4 litrelik surahi 3 litrelik surahiye bosaltildi." << endl;

cout << "4 litrelik surahideki Su Miktari:" << fourgallon << endl;

cout << "3 litrelik surahideki Su Miktari:" << threegallon << endl;

cout << endl;

cout << endl;

/////////////////////////////////////////// 4 litrelik surahi dolduruldu.

fourgallon = 4;

cout << "4 litrelik surahi dolduruldu." << endl;

cout << "4 litrelik surahideki Su Miktari:" << fourgallon << endl;

cout << endl;

cout << endl;

/////////////////////////////////////////// 4 litrelik surahi 3 litrelik surahiye bosaltildi.

temp = 3 - threegallon;

threegallon = fourgallon;

if (threegallon >= 3)

{

threegallon = 3;

}

else

{

threegallon = fourgallon;

}

fourgallon -= temp;

if (fourgallon <= 0)

{

fourgallon = 0;

}

temp = 0;

cout << "4 litrelik surahi 3 litrelik surahiye bosaltildi." << endl;

cout << "4 litrelik surahideki Su Miktari:" << fourgallon << endl;

cout << "3 litrelik surahideki Su Miktari:" << threegallon << endl;

cout << endl;

cout << endl;

}

}