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Interactions between Public Services

Table A.1 illustrates sample interactions between public services as discussed in the Chapter 4. The possible interactions between public services were displayed using the symbol '✓' and no interactions between public services were displayed using '✗'. Each interaction were assigned with a tolerable influence level(1-10) to calculate the influence between these public services agents.



Agent1 \ Agent2	Airport	Bank	Bar	Buddhist Temple	Bus Stop	Car Repair	Catholic Temple	Cemetery	Cinema	Factory	Football Stadium	Forest	Garden	Gas Station	Gov Office	Hospital	Hostel	Hotel	Library	Marsh Land	Museum	Pharmacy	Police	Post Office	Power Station	Restaurant	Road	School	Shopping Mall	House	Stadium	TV Station	Town Hall	Zoo
Airport	✓	✓	✗	✗	✓	✓	✗	✗	✗	✓	✗	✓	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
Bank	✓	✓	✓	✗	✓	✗	✗	✗	✓	✓	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗	✗	✓	✗	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
Bar	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Buddhist Temple	✓	✗	✓	✓	✓	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✓	✗	✗	✗	✓
Bus Stop	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
Car Repair	✓	✓	✗	✗	✓	✓	✗	✗	✓	✗	✓	✗	✗	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓	✗	✓	✗	✓	✓	✗	✗
Catholic Temple	✓	✗	✗	✓	✓	✗	✓	✗	✗	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗
Cemetery	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Cinema	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓	✗	✓	✗	✗	✗	✗	✗
Factory	✗	✗	✗	✗	✓	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗
Football Stadium	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓	✗	✗	✓	✗	✗	✗	✗
Forest	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✓
Garden	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✓
Gas Station	✓	✓	✗	✗	✓	✗	✗	✗	✓	✗	✓	✗	✗	✓	✓	✓	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✓	✗	✓	✓	✗	✗	✗	✗
Gov Office	✗	✓	✗	✗	✓	✗	✗	✓	✗	✓	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✗	✓	✗	✗	✗	✗
Hospital	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✓	✓	✗	✗	✗	✗	✗	✗

Hostel	x	x	✓	x	✓	x	x	✓	x	x	x	x	x	x	x	✓	x	✓	x	x	x	x	x	x	x	✓	✓	x	x	x	x	x	x	
Hotel	✓	✓	✓	x	✓	x	x	x	x	x	✓	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	
Library	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	✓	✓	x	x	x	x	x	x	
Marsh Land	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Museum	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	x	x	x	✓	x	x	x	x	x	x	x	
Pharmacy	x	✓	x	x	✓	x	x	x	x	x	x	x	x	x	✓	✓	✓	x	x	x	x	✓	x	x	x	✓	✓	x	✓	x	x	x	x	
Police	x	x	✓	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	x	✓	x	x	x	x	x	x	x	
Post Office	x	✓	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	✓	x	x	✓	x	x	x	x	
Power Station	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	✓	x	x	x	x	x	x	x	
Restaurant	✓	✓	✓	x	✓	x	x	x	✓	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	✓	✓	x	x	x	x	x	x	x	
Road	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	x	x	✓	✓	✓	x	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓
School	x	x	✓	x	✓	x	x	✓	✓	✓	✓	✓	x	x	✓	✓	✓	✓	x	x	✓	x	✓	x	✓	✓	x	x	x	x	x	x	x	
Shopping Mall	✓	✓	x	x	✓	x	x	x	✓	x	x	x	x	✓	x	x	x	✓	x	x	x	x	x	x	✓	✓	x	✓	x	x	x	x	x	
House	✓	x	✓	✓	x	x	✓	x	x	✓	✓	x	x	x	x	✓	x	✓	x	x	x	x	x	✓	x	✓	✓	x	✓	✓	x	x	x	
Stadium	✓	x	✓	x	✓	✓	x	x	x	x	✓	x	x	x	x	x	✓	x	x	x	x	x	x	✓	✓	x	✓	x	✓	x	x	x	x	
TV Station	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	x	x	✓	x	x	x	
Town Hall	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	x	x	x	✓	x	x	
Zoo	✓	x	x	x	✓	x	x	x	x	✓	x	x	x	x	x	x	x	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	✓	

Table A.1 : Interactions between public services

✓ - Possible interactions

x - No interactions

Screen Shots

When the user fed the terrain data into the system it will load map with heights as shown in Figure B.1. Then the user create one of public services in the system. As you see in the message space on left, one of the road agents are created in the city environment.

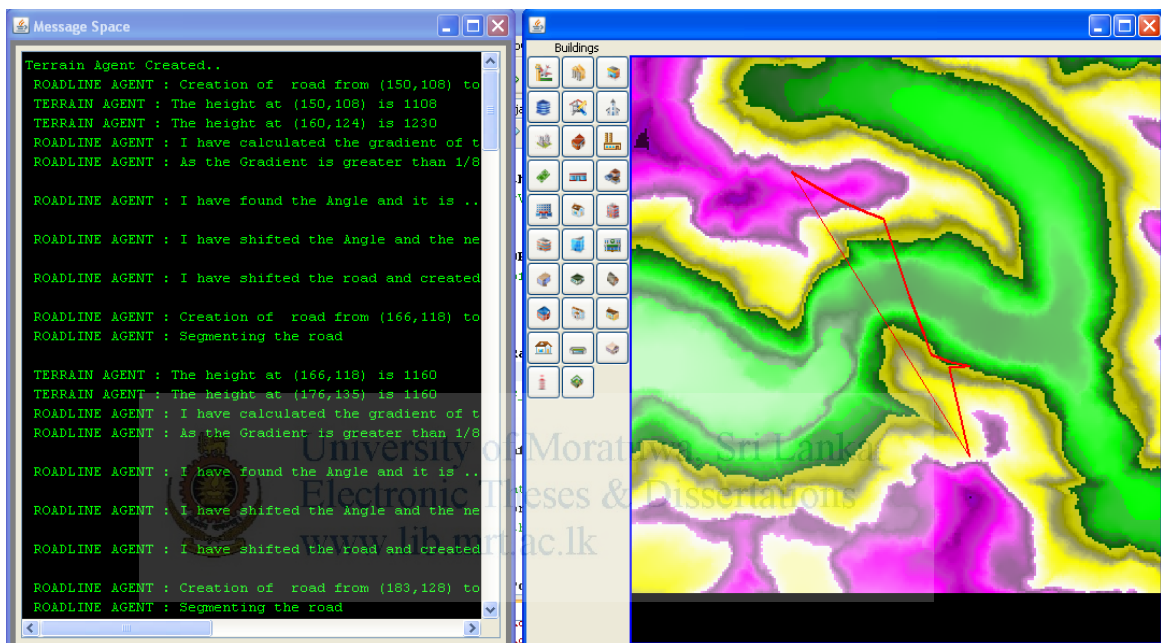


Figure B.1 : Interaction of road agent with terrain agent

Then, user can input another building service agent in to the system as Figure B.2. Here, the user input an airport agent to the system and you will be able to see the conversation between the road agent and the airport agent. The conversation is highlighted in the message space by the user to show it clearly. At first, the road agent and airport agent update their values assuming that the airport is located at its current position. Then, the road agent and the airport agent will calculate the influence between them. If influence on airport agent is higher than its tolerable influence or the influence on road agent is higher than its tolerable influence, then, the airport has to be shifted to another position. The road agent, which is a special case of public services agents, is unmovable. Therefore, in situations where the road needs to be changed will be handle by other building services agents through shifting their positions or else, the road agent and other agent will do only value update but no influence will be calculated between them.

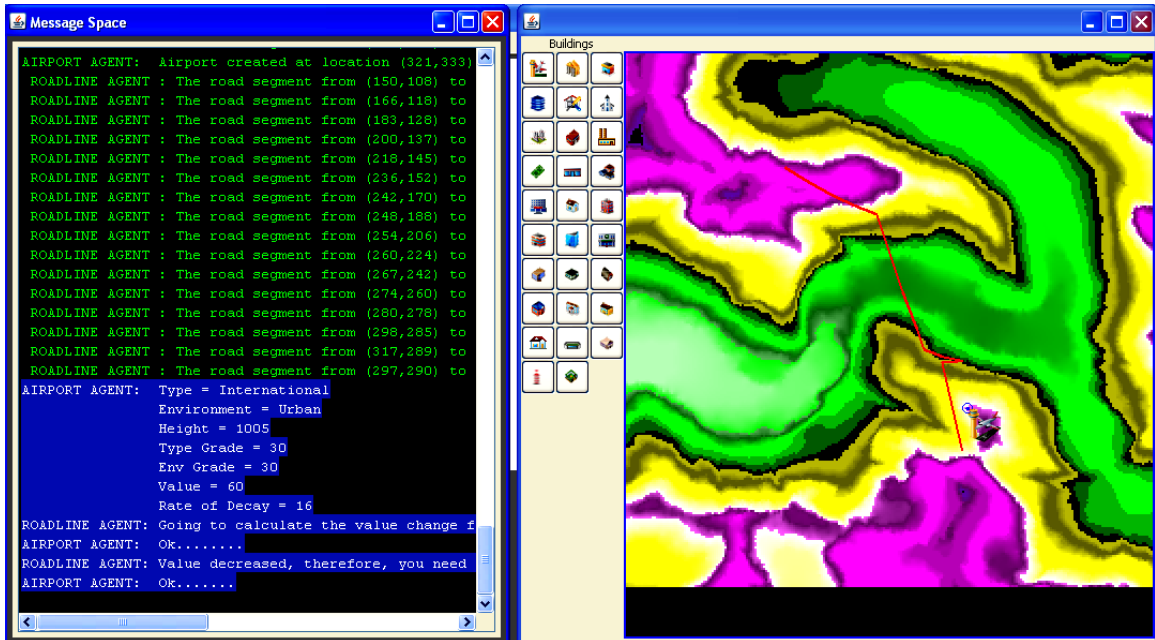


Figure B.2 : Conversation between the road agent and airport agent

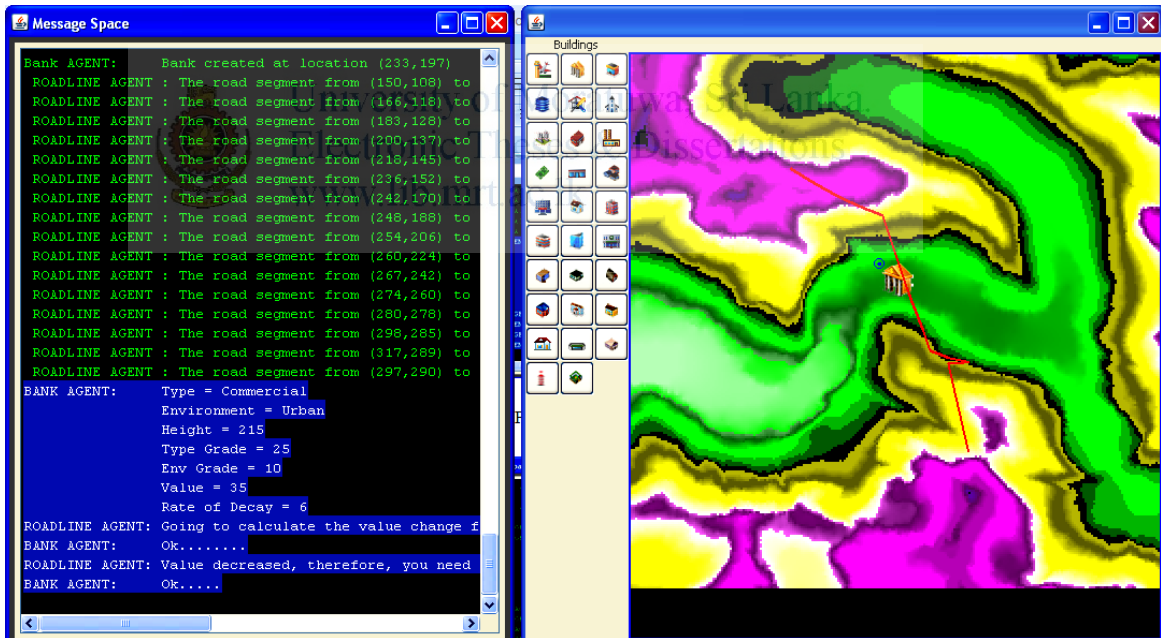


Figure B.3 : Conversation between the road agent and the bank agent

When the user created a bank in the city, the airport agent who needs to leave the position will be killed and disappeared as Figure B.3. And the bank agent started the conversation with the road agent.

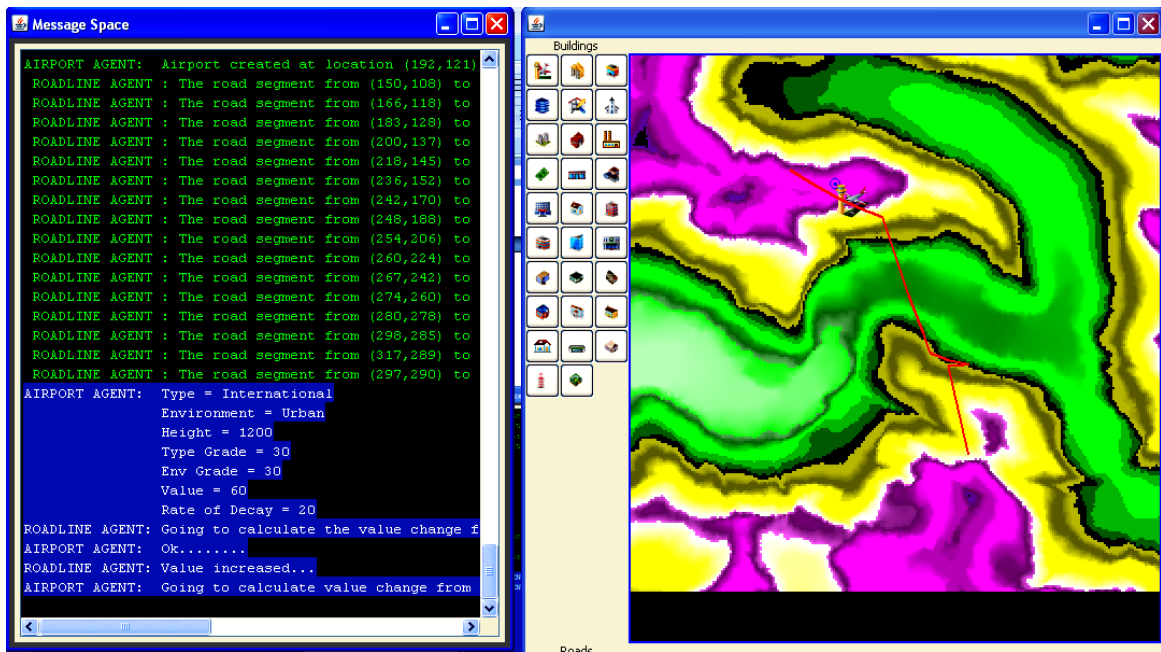
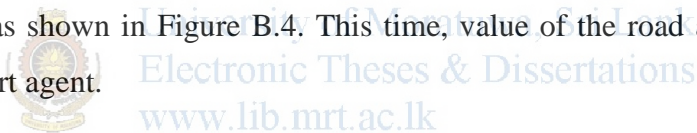


Figure B.4 : Conversation between the road agent and the airport Agent in another situation

Again, an airport agent was created at a new location which belong to a higher position of the terrain as shown in Figure B.4. This time, value of the road agent has been increased due to airport agent.



In the next scenario, resource agents have been created in the city environment without the road network as in Figure B.5. The two resource agents are airport agent and bank agent. First, the airport agent is created and it will update the message space. Secondly, the bank agent is created in the system and it also, update the message space displaying it's attributes such as the type, environment, value and rate of decay. At first, the airport agent who created first will calculate the influence from the second agent and check whether the influence exceeds its tolerable influence. If the influence is more than the tolerable influence of the airport agent it will ask the bank agent to leave the position. If influence is tolerable, then the bank agent can confirm its position.

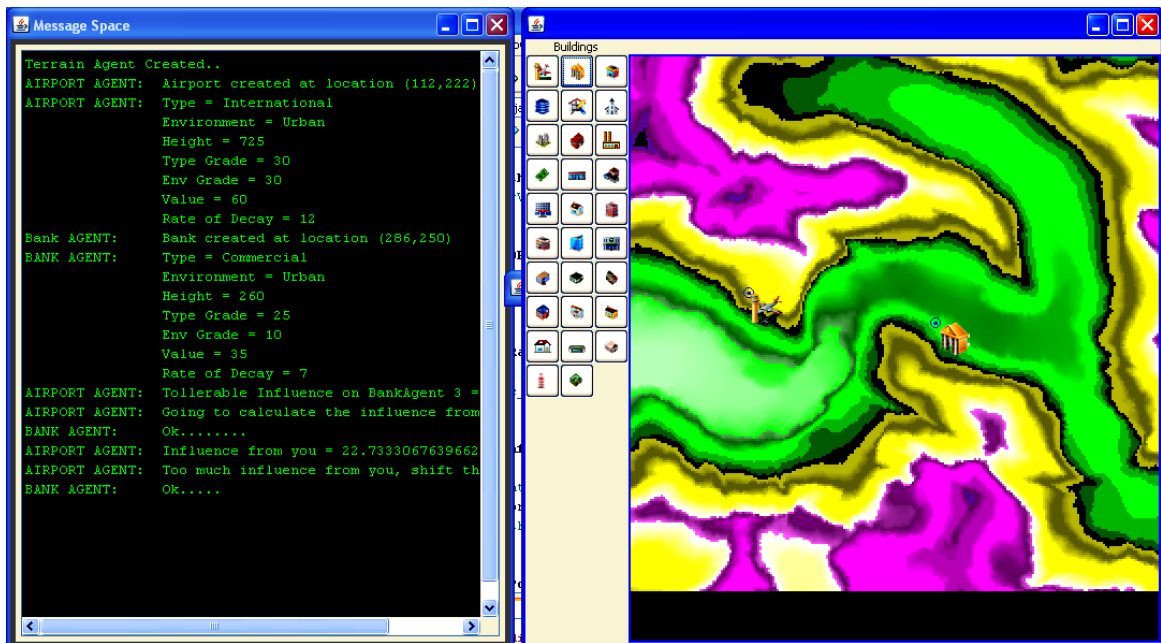


Figure B.5 : Conversation between airport agent and bank agent



Evaluation Questionnaire

Evaluator disposition

1. Name : _____

2. Nature of Employment

Civil Engineers/Architects/City Planners/Surveyors

Academic Researcher

Software Developer

Other, specifically _____

3. Experience(in years) in the area urban planning Sri Lanka.



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1-3

4-6

7-9

Above 10

4. Experience(in years) in the area of software programming

1-3

4-6

7-9

Above 10

The Problem

5. Have you ever felt the need to have a software for locating urban public services which can handle the complex interactions between resources?

Yes

No

6. Rate your overall understanding of the problem?

High

Moderate

Average

7. Do you think is it worthwhile to address this problem?



Yes

No

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The Technology

8. Up to what extent do you familiar with the Multi Agent Technology?

High

Moderate

Average

9. What do you think of using Multi Agent Technology to solve the dependency issue in locating public services?

Excellent

Satisfactory

Good

Not a good idea

Comments, if any

The Proposed Solution

10. Rate your overall understanding of the proposed solution?

- High
 Moderate
 Average

11. Do you feel that the solution which is proposed from this project will be an ideal solution to address the problem?



- Yes
 No

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The Design

12. What is your opinion on the overall design of the An Evolutionary Approach to Locating Urban Public Services?

- Excellent
 Satisfactory
 Good

Comments, if any

13. Do you think that the top level design of the Urban Public Services Locating System has covered the overall features of the solution?

Yes

No

The Implementation

14. Rate the level of customizability and flexibility provided by the proposed solution for the user, in the implementation process?

High

Moderate

Average

Comments, if any



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15. Rate your judgment about the accurateness of the prototype output?

High

Moderate

Average

Comments, if any

The Final Verdict

16. Did you find the concept behind the project appealing?

Yes

No

17. What improvements, if any, do you recommend for the proposed solution?

18. Do you feel that the proposed solution was too complex, with respect to the specified problem?

Yes

No

If 'Yes', state easier alternative solution



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19. Your comments on the overall project

Evaluator's Signature

Appendix D

Test Results

The table D.1 presents the test results that were gathered after the evaluation of the problem, technology, proposed solution, design and implementation through questionnaires (Appendix C).

The full reference for the parameter values in Table D.1 are as follows.

N - No, Y - Yes, N - Not a good idea, G - Good, S - Satisfactory, E - Excellent, A - Average, M - Moderate, H - High

Problem no	Participant1	Participant2	Participant3	Participant4	Participant5	Participant6	Participant7	Participant8	Participant9	Participant10
5	Y	Y	Y	N	Y	N	Y	Y	Y	N
6	M	H	M	A	A	H	H	A	A	A
7	Y	Y	Y	N	Y	Y	Y	Y	N	N
8	A	A	A	A	A	M	A	M	M	M
9	S	G	G	S	S	G	S	N	G	G
10	M	A	M	M	M	A	A	M	A	A
11	Y	N	N	Y	Y	Y	Y	Y	Y	N
12	S	G	S	S	G	G	G	G	G	S
13	Y	N	Y	Y	Y	Y	Y	Y	Y	N
14	A	A	A	A	A	A	M	M	M	A
15	M	A	A	A	M	M	M	A	A	M
16	Y	Y	Y	Y	Y	N	N	Y	Y	Y
18	N	N	N	N	N	N	N	N	N	Y

Table D.1: Evaluation Results