**University of Msila**

**Faculty of Mathematics and Computer Science 16/1/2024**

**Department of Computer Science Duration : 1H 30**

**Technology of Agents Exam (**1st year of Master's AI**)**

**First name : ………………………………….Last name :……………… ….……………………….**

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* **Course Comprehension Questions (12 pts) :** put a cross on the **correct answers**

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| **1-**  **Multi-agent systems are inspired from :** |
| - Artificial Intelligence (AI)  - Distributed Artificial Intelligence (DAI) **X**  - Expert Systems |
| **2- The autonomy of an agent means:** |
| * **-** That an agent can make operational decisions  **X** * **-** That an agent can make decisions regarding tasks execution **X** * **-** That an agent can make decisions regarding resource utilization  **X** |
| **3- In a Multi-agent system (** MAS**), negotiation follows a protocol: :** |
| * - Propose, evaluate, accept, or refuse  **X** * - Propose, evaluate, decide * - Propose, evaluate, respond |
| **4- Point-to-point message sending is preferred:** |
| * - In MAS composed of reactive agents * - In MAS composed of cognitive agents  **X** * - In MAS composed of hybrid agents |
| **5- Negotiation allows resolving:** |
| * - Cooperation between agents * - Coordination between agents * - Conflicts between agents  **X** |
| **6- Interaction among agents means:** |
| * - Communication between agents * - All relations between agents  **X** * - Sending messages between agents |
| **7- In the ACL language, the createreply primitive allows:** |
| * - Inserting the local name of an agent * - Inserting the adress of an agent  **X** * - Inserting The message language |
| **8- The Remote Monitoring Agent (RMA) in the JADE platform allows :** |
| * - Managing the operations of agents * - Adding or removing agents  **X** * - Adding or removing containers  **X** |
| **9-**  The method **action()** means : |
| - what the behaviour actually does  **X**  - what the agent actually does  - what the environnment actually does |
| **10- The resolution of conflicts is done through:** |
| * - **Negotiation X** * **- Task distribution** * **- Arbitration (arbitrage) X** |
| **11- A cyclic behavior of an agent can be stopped by:** |
| * - a **return()** statement  **X** * - a **block()** statement  **X** * - a **done()** function  **X** |
| **12- The DF (Directory Facilitator) in the JADE platform is an agent that:** |
| * Supervises other agents and their access to the platform. * Provides a Yellow Pages service (cataloging available services).  **X** * Facilitates routing for interactions between agents within and outside the platform |

* **Exercice 1 (4 pts) :** 1- Specify the role of each instruction.

2- Explain the role of this code

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| public class A1 extends Agent{  public void setup(){  this.addBehaviour(new OneShotBehaviour(){  public void action(){  System.out.println("I want to play !");  ACLMessage Msg = new ACLMessage();  Msg.setContent("Go");  Msg.setSender(this.myAgent.getAID());  Msg.addReceiver(new AID(new String("B1"),  AID.ISLOCALNAME));  this.myAgent.send(Msg); } }); } }  public class B1 extends Agent{  public void setup(){  this.addBehaviour(new CyclicBehaviour (){  public void action(){  ACLMessage Msg = this.myAgent.receive();  if (Msg != null)  {  System.out.println("a message is received from the agent: "+ this.myAgent.getLocalName());  if (Msg.getContent().equals("Go"))  { System.out.println("the message received is: Go");  ACLMessage Msg1 = Msg.createReply();  Msg1.setContent("OK");  this.myAgent.send(Msg1);  System.out.println("a messageOK is sent ");  }  } else{ block(); } } } | -Declaration of the class A1   * Declaration of the method setup(tasks) * Adding oneshotbahaviour to the agent * Define tasks of the agent (action)   -creating new ACL message  - setting the content of the message at GO  - setting the sender address at the actual agent adress  - setting the receiver address at the B1 adress  - sending the message  - Declaration of the class B1   * Declaration of the method setup(tasks) * Adding cyclicbahaviour to the agent * Define tasks of the agent (action)   -receiving an ACL message  -testing the contenent of the message if not empty  - printing :a message is received from the agent A1  -testing the contenent of the message if = Go  -printing :the message is received is Go  - creating a reply  - setting the content of the message at OK  - sending the message  - printing :a message OK is sent  - if the message content is not GO blocking the agent |
| * 1. This code allows two agents A1, B1 to exchange messages :   A1 send GO to B1  B1 replying according to the message received by OK or bloking | |

* **Exercice 2 (4 pts) : Specify the role of the following primitives**:

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| **takeDown**() | Called before an agent is deleted |
| **done**() | Testing Whether the behaviour is finished |
| **myAgent.getAID()** | Obtain the address of the agent actually running |
| **reply.setPerformative** | Setting the performative of a reply to a massage |

**Bon Courage**