University of Msila
Faculty of Mathematics and Computer Science
Department of Computer Science

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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**

1- The behavior of an agent consists of:
- Executing the plans of an agent X - Executing the tasks of an agent X - Executing the intentions of an agent X
2- Sending messages in broadcast mode is preferred**:**
- In MAS (Multi-Agent Systems) composed of reactive agents X - In MAS composed of hybrid agents - In MAS composed of cognitive agents
3- Conflict resolution among agents is achieved through:
- Cooperation - Negotiation X - Coordination
4- Interaction among agents means:
- All forms of communication between agents X - The behaviors of the agents - Sending and receiving messages only
5- In an ACL message, the performative **field is used to:**
- Define the type of the message X - Define the content of the message - Define the priority of the message
6- An agent in the JADE platform can terminate with:
- doDelete() ; X - terminate() ; - Done()=true ; X
7- The KQML language is used in :
- A MAS (Multi-Agent System) based on reactive agents - A MAS based on cognitive agents X - A MAS based on hybrid agents
8- Negotiation allows to :
- Change the beliefs of agents X - Change the messages between agents - Resolve conflicts between agents X
9- Receiving an ACL message requires:
- A Oneshot behavior - A Cyclic behavior X - A Sequential behavior
10- The instruction createReply() allows to :
- Create a message containing the address of the recipient X - Create a message containing the address of the sender - Create an automatic reply message
11- A cyclic behavior of an agent can stop by:
- A **done()** function X - A **return()** instruction X - A **block()** instruction X
12- The task allocation between agents allows to:

- Ensure a balanced distribution of tasks according to the agents' capabilities X - Reduce processing time by assigning specific tasks to each agent X - Improve coordination and cooperation between agents X

Exercise 1 (6 pts) : What is the result of executing the following code (list the execution steps)?

```
public class   A  extends  Agent
{public   void  setup( )
  {this.addBehaviour (new OneShotBehaviour( )
    {public void action( )
     {System.out.println("I will initiate a play !");
      ACLMessage Msg= newACLMessage();
      Msg.setContent("throw 1");
      Msg.setSender(this.myAgent.getAID());
    Msg.addReceiver(newAID(newString("B"),
AID.ISLOCALNAME));
      this.myAgent.send(Msg);
     }
  }
}
}
public class  B  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 by the
agent : "+  this.myAgent.getLocalName( ));
     if (Msg.getContent().equals("throw 1"))
    {System.out.println("The recived message is: throw 1");
     ACLMessage Msg1= Msg.createReply();
     Msg1.setContent("throw 2");
     this.myAgent.send(Msg1);
    }
    else  {System.out.println("The recived message is:
throw 2");
          ACLMessage Msg1= Msg.createReply( );
          Msg1.setContent("throw1");
          this.myAgent.send(Msg1);              }
           }
    else  {   block();  }
} }
} }
```

1.An agent A has a OneShotBehaviour

2.A print the message I will initiate a play

3. A create an ACL message with :

The content :throw1

The receiver: the agent that has a name B

4. A send the message

……

5. An agent B has a CyclicBehaviour

6. B receive a message

7. B test if the received message is not empty

8.B print the message: A message is received by the agent A

9. B test if the message = throw1

If yes

- B print The recived message is: throw 1
- B create a reply to A
- The content of the message is throw2
- B send the reply to A

else

- B print The recived message is: throw 2
- B create a reply to A
- The content of the message is throw1
- B send the reply to A

10. if the message received is empty B execute block()

➢ **Exercise 2 (2 pts) :** Give the **<u>exact</u>** definition of the following primitives:

jade.core.Agent	A class from which we can inherit an agent
Action()	A method that contain the tasks of an agent.
jade.lang.acl.ACLMessage	A class from which we can inherit an ACL message
this.addBehaviour(C)	Adding the behavior C to the curent agent, that is pointed by this

Good Luck