EXAM SESSION

A.U:	2021/2022	**Cycle:**	Engineer
Course Title	**Interactive Decision Support System**	**Level**	3rd year
Course Code	**CSE541/1**	**Speciality**	ILSI
Date:	05/12/2021	**Duration**	2H
Documents:	Not allowed	**No. of pages**	2

Exercise	*1(4pts)*	*2(5pts)*	*3(11pts)*
C.L.Os Assessement	*K2, K3,*	*K2, K3, S2, S4,*	*S2, S4, V2, V4*

Exercise 1(04pts) :

1. What is an interactive decision support system.

2. List the types of decision models.

3. Define the structure of a Marakas decision support system.

Exercise 2(05pts) :
A manufacturer produces 2 types of strawberry yogurt A and B from Strawberry, Milk and Sugar. Each yogurt must respect the following proportions of raw materials.

	A	E
strawberry	2	1
milk	1	2
sugar	0	1

We have 800 Kg of Strawberries, 700 Kg of Milk and 300 Kg of sugar. The sale of 1 Kg of yogurts A and B brings in 4€ and 5€ respectively. The manufacturer seeks to maximize his profit

1- On what quantities can we work?
2- What are we trying to optimize?
3- What are the constraints of the problem?

Exercise3(11pts):

A farmer must determine the number of hectares of wheat that he must cultivate. He has the choice between three surface categories:
•d1 cultivate a small area
•d2 cultivate a medium area

•d3 cultivate a large area
Future demand for wheat is highly uncertain, given previous harvests and competing products.

The farmer realizes that if he decides to grow wheat on a large area (d3) and if the upcoming demand for wheat is low, he could lose a lot of money. On the other hand, if he decides to cultivate a small area (d1) and the demand rises, he could have had a higher profit by making another decision.
He estimated the demand at three levels: n1, n2 and n3 and prepared the following profit table:

	n1(low demand)	n2(average demand)	n3(strong demand)
d1(small area)	400	400	400
d2(medium area)	100	600	600
d3 (big area)	-300	300	900

The request is now evaluated by the following probabilities: $p(n1) = 0.2$, $p(n2) = 0.35$ and $p(n3) = 0.45$.
-What is the best decision according to the criterion of mathematical expectation of profit? (specifying all the calculation details).
 The farmer can ask a statistical organization to carry out a study on the evolution of the demand for wheat (the cost of this study: p). The only indications that the organization was able to provide him are the following indicators:
i1: decreasing demand
i2: stable demand
i3: growing demand
as well as the following conditional probabilities:

P(ik| ni)	n1	n2	n3
i1	0.6	0.4	0.1
i2	0.3	0.4	0.4
i3	0.1	0.2	0.5

According to operating results:
- low request: 500
-average request: 700
-strong demand: 900

- Draw the decision tree associated with the problem; solve it according to the criterion of the mathematical expectation of the gains by specifying when it is interesting to make a study of the request.