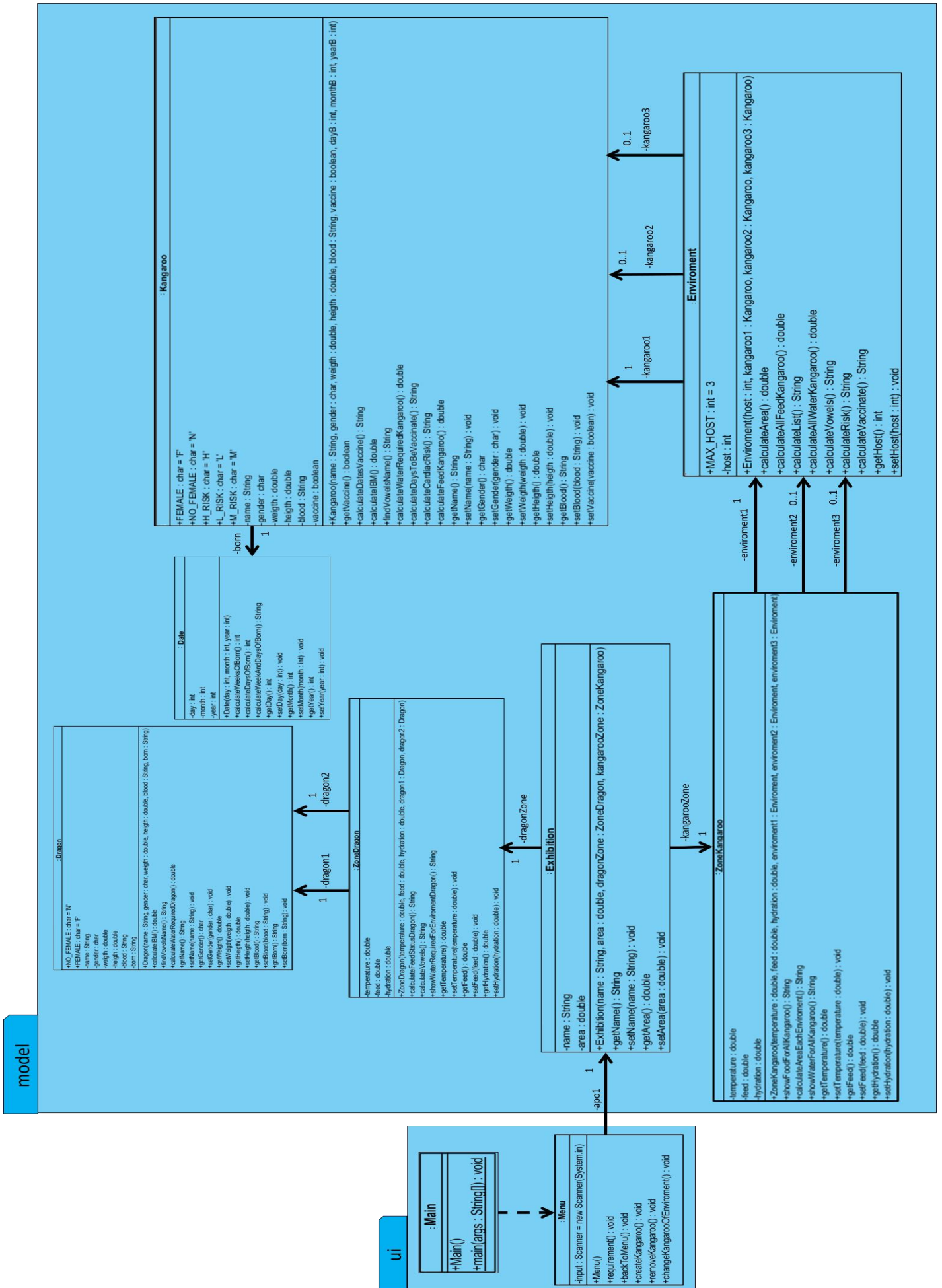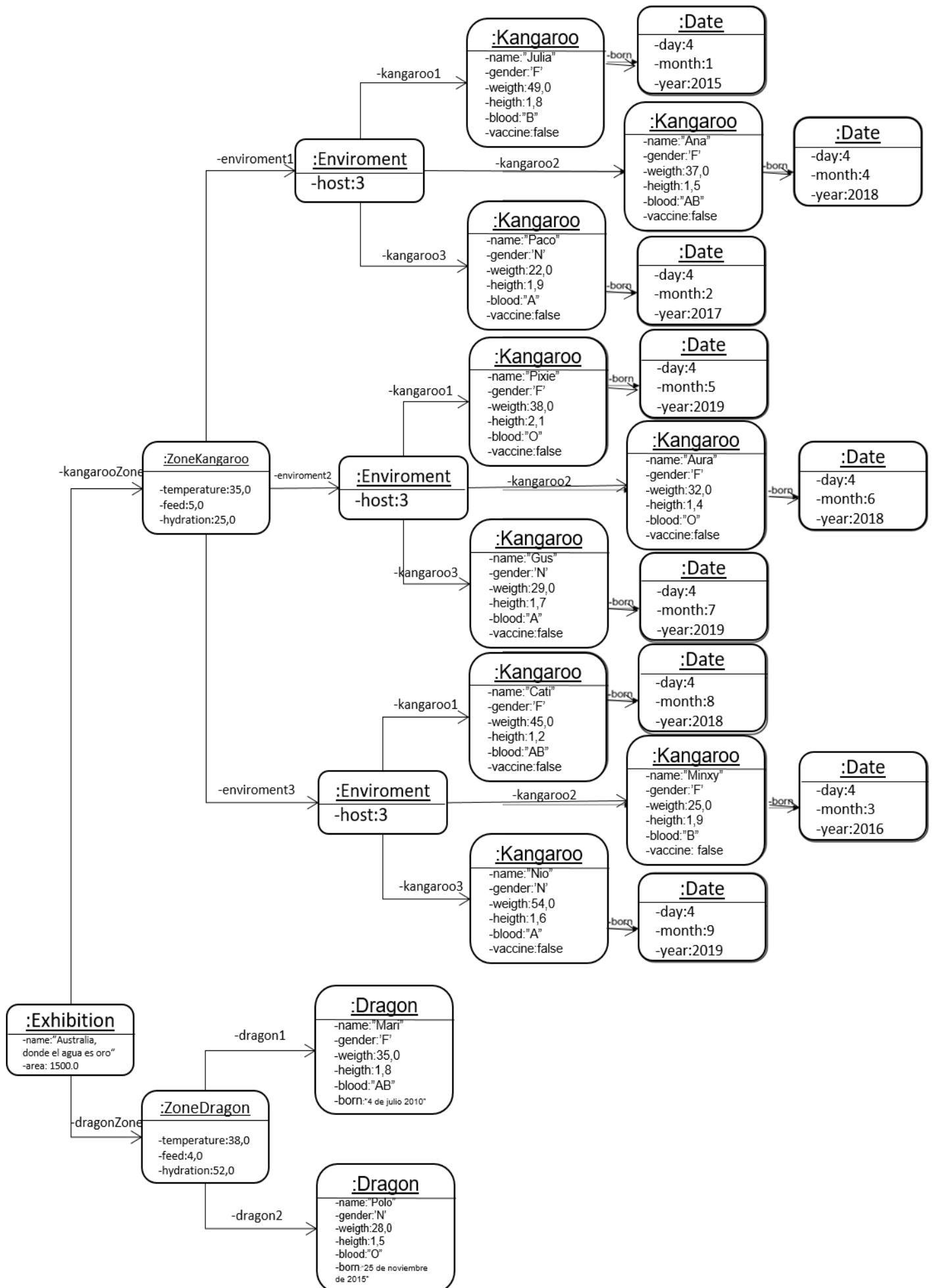## *IDENTIFICATION OF THE PROBLEM*

The Cali Zoo is a zoological park founded in 1969 located in the Colombian city of Santiago de Cali (Colombia). It is located in the old Municipal Forest on the banks of the Cali River, has more than 250 animals of 270 different species, offers rides and other attractions for children and adults. The problem is to develop a monitoring software for the Australian exhibition. The construction despite having an old farm look, and somehow worn, has a high technology in the care of animals. They have the problem with the sexes of the kangaroos. It is also a problem to be able to monitor the area of the environment. Biologists become insufficient food; Also, they do not know how much food to give to animals and water for all animals. They also have a problem with kangaroos. Another concern is a report of the vaccination dates of the kangaroos.

CLASS DIAGRAM

Package: model

:Kangaroo
```
+FEMALE : char = 'F'
+NO_FEMALE : char = 'N'
+H_RISK : char = 'H'
+L_RISK : char = 'L'
+M_RISK : char = 'M'
-name : String
-gender : char
-weight : double
-heigth : double
-blood : String
-vaccine : boolean
+Kangaroo(name : String, gender : char, weigth : double, heigth : double, blood : String, vaccine : boolean, dayB : int, monthB : int, yearB : int)
+getVaccine() : boolean
+calculateDatesVaccine() : String
+calculateIBM() : double
+findVowelsName() : String
+calculateWaterRequiredKangaroo() : double
+calculateDaysToBeVaccinate() : String
+calculateCardiacRisk() : String
+calculateFeedKangaroo() : double
+getName() : String
+setName(name : String) : void
+getGender() : char
+setGender(gender : char) : void
+getWeigth() : double
+setWeigth(weigth : double) : void
+getHeigth() : double
+setHeigth(heigth : double) : void
+getBlood() : String
+setBlood(blood : String) : void
+setVaccine(vaccine : boolean) : void
```

:Date
```
-day : int
-month : int
-year : int
+Date(day : int, month : int, year : int)
+calculateWeeksOfBorn() : int
+calculateDaysOfBorn() : int
+calculateWeekAndDaysOfBorn() : String
+getDay() : int
+setDay(day : int) : void
+getMonth() : int
+setMonth(month : int) : void
+getYear() : int
+setYear(year : int) : void
```

:Dragon
```
+NO_FEMALE : char = 'N'
+FEMALE : char = 'F'
-name : String
-gender : char
-weigth : double
-heigth : double
-blood : String
-born : String
+Dragon(name : String, gender : char, weigth : double, heigth : double, blood : String, born : String)
+calculateIBM() : double
+calculateWaterRequiredDragon() : double
+findVowelsName() : String
+getName() : String
+setName(name : String) : void
+getGender() : char
+setGender(gender : char) : void
+getHeigth() : double
+setHeigth(heigth : double) : void
+setWeigth(weigth : double) : void
+getBlood() : String
+setBlood(blood : String) : void
+getBorn() : String
+setBorn(born : String) : void
```

:ZoneDragon
```
-temperature : double
-feed : double
-hydration : double
+ZoneDragon(temperature : double, feed : double, hydration : double, dragon1 : Dragon, dragon2 : Dragon)
+calculateFeedStatusDragon() : String
+showWaterRequiredForEnviromentDragon() : String
+calculateVowels() : String
+getTemperature() : double
+setTemperature(temperature : double) : void
+getFeed() : double
+setFeed(feed : double) : void
+getHydration() : double
+setHydration(hydration : double) : void
```

:Exhibition
```
-name : String
-area : double
+Exhibition(name : String, area : double, dragonZone : ZoneDragon, kangarooZone : ZoneKangaroo)
+getName() : String
+setName(name : String) : void
+getArea() : double
+setArea(area : double) : void
```

:ZoneKangaroo
```
-temperature : double
-feed : double
-hydration : double
+ZoneKangaroo(temperature : double, feed : double, hydration : double, environment1 : Enviroment, environment2 : Enviroment, environment3 : Enviroment)
+showFoodForAllKangaroo() : void
+calculateAreaForEachEnviroment() : String
+showWaterForAllKangaroo() : String
+getTemperature() : double
+setTemperature(temperature : double) : void
+getFeed() : double
+setFeed(feed : double) : void
+getHydration() : double
+setHydration(hydration : double) : void
```

:Enviroment
```
+MAX_HOST : int = 3
-host : int
+Enviroment(host : int, kangaroo1 : Kangaroo, kangaroo2 : Kangaroo, kangaroo3 : Kangaroo)
+calculateArea() : double
+calculateAllFeedKangaroo() : double
+calculateList() : String
+calculateAllWaterKangaroo() : double
+calculateVowels() : String
+calculateRisk() : String
+calculateVaccinate() : String
+getHost() : int
+setHost(host : int) : void
```

Associations: -born 1, -dragon1 1, -dragon2 1, -dragonZone 1, -kangarooZone 1, -kangaroo1 1, -kangaroo2 0..1, -kangaroo3 0..1, -enviroment1 1, -enviroment2 0..1, -enviroment3 0..1, -apo1 1

Package: ui

:Main
```
+Main()
+main(args : String[]) : void
```

Menu
```
-input : Scanner = new Scanner(System.in)
+Menu()
+requirement() : void
+backToMenu() : void
+createKangaroo() : void
+removeKangaroo() : void
+changeKangarooOfEnviroment() : void
```

OBJECT DIAGRAM

:Kangaroo
- -name:"Julia"
- -gender:'F'
- -weigth:49,0
- -heigth:1,8
- -blood:"B"
- -vaccine:false

-born →

:Date
- -day:4
- -month:1
- -year:2015

-kangaroo1

:Enviroment
- -host:3

-enviroment1

-kangaroo2 →

:Kangaroo
- -name:"Ana"
- -gender:'F'
- -weigth:37,0
- -heigth:1,5
- -blood:"AB"
- -vaccine:false

-born →

:Date
- -day:4
- -month:4
- -year:2018

-kangaroo3 →

:Kangaroo
- -name:"Paco"
- -gender:'N'
- -weigth:22,0
- -heigth:1,9
- -blood:"A"
- -vaccine:false

-born →

:Date
- -day:4
- -month:2
- -year:2017

:ZoneKangaroo
- -temperature:35,0
- -feed:5,0
- -hydration:25,0

-kangarooZone

-enviroment2 →

:Enviroment
- -host:3

-kangaroo1 →

:Kangaroo
- -name:"Pixie"
- -gender:'F'
- -weigth:38,0
- -heigth:2,1
- -blood:"O"
- -vaccine:false

-born →

:Date
- -day:4
- -month:5
- -year:2019

-kangaroo2 →

:Kangaroo
- -name:"Aura"
- -gender:'F'
- -weigth:32,0
- -heigth:1,4
- -blood:"O"
- -vaccine:false

-born →

:Date
- -day:4
- -month:6
- -year:2018

-kangaroo3 →

:Kangaroo
- -name:"Gus"
- -gender:'N'
- -weigth:29,0
- -heigth:1,7
- -blood:"A"
- -vaccine:false

-born →

:Date
- -day:4
- -month:7
- -year:2019

-enviroment3 →

:Enviroment
- -host:3

-kangaroo1 →

:Kangaroo
- -name:"Cati"
- -gender:'F'
- -weigth:45,0
- -heigth:1,2
- -blood:"AB"
- -vaccine:false

-born →

:Date
- -day:4
- -month:8
- -year:2018

-kangaroo2 →

:Kangaroo
- -name:"Minxy"
- -gender:'F'
- -weigth:25,0
- -heigth:1,9
- -blood:"B"
- -vaccine: false

-born →

:Date
- -day:4
- -month:3
- -year:2016

-kangaroo3 →

:Kangaroo
- -name:"Nio"
- -gender:'N'
- -weigth:54,0
- -heigth:1,6
- -blood:"A"
- -vaccine:false

-born →

:Date
- -day:4
- -month:9
- -year:2019

:Exhibition
- -name:"Australia, donde el agua es oro"
- -area: 1500.0

-dragonZone

:ZoneDragon
- -temperature:38,0
- -feed:4,0
- -hydration:52,0

-dragon1 →

:Dragon
- -name:"Mari"
- -gender:'F'
- -weigth:35,0
- -heigth:1,8
- -blood:"AB"
- -born:"4 de julio 2010"

-dragon2 →

:Dragon
- -name:"Polo"
- -gender:'N'
- -weigth:28,0
- -heigth:1,5
- -blood:"O"
- -born:"25 de noviembre de 2015"

FUNCTIONAL REQUIREMENTS

R1#	Deploying the area of each environment
SUMMARY	The system allows deploying the area of each environment through a monitoring system.
INPUTS	-Height of the animal
OUTPUTS	The area of the enviroment

R2#	Calculate the amount of food to the kangaroo
SUMMARY	The system allows to calculate the amount of food that is required to feed the kangaroos
INPUTS	-Kangaroo weigth
OUTPUTS	amount of food to the kangaroo

R3#	Administer vaccine to kangaroo
SUMMARY	The system allows to know how many weeks and days are left to vaccinate kangaroos against rabies
INPUTS	-Birthday of the animal -name of the animal
OUTPUTS	If doesn't have to be vaccinated or the days to be vaccinated

R4#	Calculate risk of heart disease of Kangaroo
SUMMARY	The system allows to establish the risk of cardiac diseases in kangaroos
INPUTS	-body mass index of the Kangaroo
OUTPUTS	risk of heart disease of the Kangaroo

R5#	Notify feed status of the dragon
SUMMARY	The system allows to notify when there is less than 5kg of food in the food area
INPUTS	-feed status in the area of the dragons.
OUTPUTS	If area of food for the dragons need refill or not

R6#	Know the amount of water required for environments
SUMMARY	The system allows to know the amount of water that must be supplied in the environments
INPUTS	-body mass index of the animal
OUTPUTS	amount of water required for environments

R7#	Create new kangaroo and add them to an Environment.		
SUMMARY	The system allows to create kangaroos and add them to an environment		
INPUTS	- name -weigth -blood	-gender -heigth -vaccine	-day of born -month of born -year of born
OUTPUTS	Kangaroo created an added to environment.		

R8#	Remove kangaroos of the zoo
SUMMARY	The system allows to remove an specific kangaroo of the zoo.
INPUTS	-Name of the kangaroo.
OUTPUTS	Kangaroo was removed.

R9#	Change environment kangaroos
SUMMARY	The system allows to change a Kangaroo from the one environment to other.
INPUTS	-name of Kangaroo -new environment
OUTPUTS	Kangaroo changed of environment.

R10#	Find animals the names that begin and end with vowel.
SUMMARY	The system allows to find the animals, which in their name have a vowel at the beginning and at the end
INPUTS	-
OUTPUTS	Listo of the animals with that type of name.

R11#	Give a report of the vaccination dates of the kangaroos.
SUMMARY	The system allows to know how many weeks and days left to vaccinate kangaroos
INPUTS	-
OUTPUTS	List of weeks and days left to vaccinate all kangaroos

TRACEABILITY ANALYSIS

F.R.	CLASS	METHOD
R1: *Deploying the area of each environment*	:ZoneKangaroo :Enviroment :Kangaroo	+calculateAreaEachEnviroment():String +calculateArea():double +getHeigth():double
R2: *Calculate the amount of food to the kangaroo*	:ZoneKangaroo :Enviroment :Kangaroo	+showFoodForAllKangaroo():String +calculateAllFeedKangaroo ():double +calculateFeedKangaroo():double
R3: *Administer vaccine to kangaroo*	:ZoneKangaroo :Kangaroo :Date :Date :Date	+ calculateVaccinate():String +calculateDaysToBeVaccinate():Sring +calculateWeeksOfBorn():int +calculateDaysOfBorn():int +calculateWeekAndDaysOfBorn():String
R4: *Calculate risk of heart disease of Kangaroo*	:Enviroment :Kangaroo :Kangaroo	+calculateRisk():String + calculateCardiacRisk():String +calculateIBM():double
R5: *Notify feed status of the dragon*	:ZoneDragon	+calculateFeedStatusDragon ():
R6: *Know the amount of water required for environments*	:ZoneKangaroo :Enviroment :Kangaroo :ZoneDragon :Dragon	+showWaterForAllKangaroo():String +calculateAllWaterKangaroo():double +calculateWaterRequiredKangaroo():double +showWaterRequiredForEnviromentDragon(): +calculateWaterRequiredDragon(): double
R7: *Create new kangaroo and add them to an Environment.*	:Menu	+createKangaroo():void
R8: *Remove kangaroos of the zoo*	:Menu	+removeKangaroo():void
R9: *Change environment kangaroos*	:Menu	+changeKangarooOfEnviroment ():void

R10: *Find animals the names that begin and end with vowel.*	:DragonZone :Dragon :Enviroment :Kangaroo	+calculateVowels():String +findVowelsName():String +calculateVowels():String +findVowelsName():String
R11: *Give a report of the vaccination dates of the kangaroos.*	:Enviroment :Kangaroo :Date :Date :Date :Date	+calculateList():String +calculateDatesVaccine():String +calculateWeeksOfBorn(): +calculateDaysOfBorn(): +getMonth(): +getDay():