**Game: Farm Funny**

Mr **MacDonald** has a farm of animals. There are 4 kinds of animals in his farm: **chicken**, **cat**, **dog** and **pig**.

In this game, you will control MacDonald to manage his farm to earn money.

Below is description for characters and activities in game.

1. **Animal:**

**Properties:**

- **Name**: Mr MacDonald will name an animal when it is born or bought.

- **Age**: count in days.

**1 day** in game = **about** **1 minute** in real life. User can get timestamp by \_\_TIMESTAMP\_\_ to determine day in game.

An animal starts from **0 day old** when it is born or bought.

Lifetime - animal will **die** after this duration:

|  |  |
| --- | --- |
| **Animal** | **Life time (days)** |
| Chicken | 15 |
| Cat | 20 |
| Dog | 25 |
| Pig | 22 |

- **Weight**:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Animal** | **When born or buy (Kg)** | **Max (Kg)** | **Gain weight** | **Condition for Gain weight** |
| Chicken | 0 | 2 | +0.2 / 2 days | fed in 2 consecutive days |
| Cat | 0 | 4 | +1 / 3 days | fed in 3 consecutive days |
| Dog | 0 | 7 | +1 / 2 days | fed in 2 consecutive days |
| Pig | 0 | 10 | +1 / 1 day | fed in 1 consecutive day |

- **Happy index: 0-10**. The default is **7** when it is born or bought.

+ Pig doesn't have this index.

- **Intelligent index: 0-10**. The default is **0** when it is born or bought.

+ Only Dog has this index.

- **Price**:

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| --- | --- | --- | --- |
| **Animal** | **Sell** | **Condition to sell** | **Buy** |
| Chicken | 2 USD/ 1 unit | weight = 2 kg | 4 USD/ 1 unit |
| Cat | 4 USD/ 1 unit | age > 10 | 7 USD/ 1 unit |
| Dog | 5 USD/ 1 unit  10 USD/ 1 unit (if Intelligent index = 10) | age > 12 | 8 USD/ 1 unit |
| Pig | 1 USD / 1kg meat | age > 5 | 6 USD/ 1 unit |

**Actions:**

**- Sound:** Chicken sounds "**Bawk!**", Cat sounds "**Meow!**", Dog sounds "**Woof!**" and Pig sounds "**Oink!**".

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| --- | --- | --- | --- | --- |
| **Animal** | **Number of sounds per day per animal** | **Day time to sound** | **Happy index reduction by sounds** | **Condition to reduce happy index by sounds** |
| Chicken | 1 | At 6h AM | -1 | Hear **10** sounds from Cats, Dogs and Pigs in a day |
| Cat | 1 | At 1h AM | -1 | Hear **15** sounds from Dogs and Chickens in a day |
| Dog | 1 | At 8h PM | -1 | Hear **5** sounds from Cats in a day |
| Pig | 1 | At 12h AM if they are hungry | n.a | n.a |

- **Eat**:

|  |  |  |
| --- | --- | --- |
| **Animal** | **Food** | **Sound** |
| Chicken | eat 1 food unit/day | 1 sound/ unit |
| Cat | age < 2 don’t eat; age >= 2 eat 2 food units/day | 1 sound/ unit |
| Dog | age < 3 don’t eat; age >= 3 eat 3 food units/day | 1 sound/ unit |
| Pig | age < 2 cannot eat; age >= 2 eat 7 food units/day | 1 sound/ unit |

- **Reproduce**:

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| --- | --- | --- | --- | --- |
| **Animal** | **Number of children** | **Time to reproduce** | **Condition to reproduce** | **Baby animal sound when it is born** |
| Chicken | 1->3 units (random) | at 13 days old | weight = 2 kg and happy index = 10 | 3 sounds/ unit |
| Cat | 1 unit | at 18 days old | weight = 4 kg and happy index = 10. | 2 sounds/ unit |
| Dog | 1 unit | at 22 days old | weight = 7 kg and happy index = 10 kg and intelligent index = 10. | 1 sound/ unit |
| Pig | 1->2 units (random) | at 20 days old | weight = 10 kg | 2 sounds/ unit |

- **Go out**: If an animal go out in a day, it can increase **happy index** and is **not affected** by other animal **sounds**. The animal will automatically go back to the farm **after 12h PM** except **Cat**.

**Chicken** and **Dog** can go out only from **4h AM to 12h PM** (night). **Cat** can go out in **any time** in a day.

**Happy index** **+2** each time an animal go out. There is maximum **1 time** for going out in a day for each animal.

**Happy index** **-1** if an animal doesn't go out in **2 days**.

If **Happy index** **< 3**, it cannot eat.

- **Die**: Animal will die when its **lifetime** is reached or **happy index = 0 in 3 consecutive days**.

|  |  |
| --- | --- |
| **Animal** | **Sound when die** |
| Chicken | 4 sounds/ unit |
| Cat | 3 sounds/ unit |
| Dog | 2 sounds/ unit |
| Pig | 3 sounds/ unit |

- **Train**: Only Dog can be trained.

+ Intelligent index **+2** each time it is trained. There is maximum **1 time** for training in a day for each dog.

1. **Resource:**

- **Food**: 50 units when game starts.

- **Money**: 20 USD when game starts.

MacDonald can use money to **buy** food (1 USD = 10 food units).

1. **MacDonald**

- Can feed animal.

- Can let animal out.

- Can buy more animal.

- Can sell animal.

- Can buy more food.

- Can report animal and resource status.

User can type command in **Command Prompt** to control **MacDonald activities**.

|  |  |
| --- | --- |
| **Command** | **Description** |
| **report all** | Report resource and all animals. |
| **report resource** | Report resource. |
| **report animals** | Report all animals. |
| **feed animals** | Give food to all animals in MacDonald’s farm. |
| **feed chickens(/cats/dogs/pigs)** | Give food to an animal type. |
| **feed <animal name>** | Give food to an animal. |
| **let animals out/back** | Let all animals out/back. |
| **let chickens(/cats/dogs/pigs) out/back** | Let an animal type out/back. |
| **let <animal name> out/back** | Let an animal out/back. |
| **buy <animal type> <animal name>** | Buy an animal. |
| **sell <animal type> <animal name>** | Sell an animal. |
| **sell <animal type>** | Sell an animal type. |

There are **notices** to screen for **animal actions** and **resource changes** for MacDonald to know about status change.

When game starts, MacDonald has **no animal**.

**Output requirements:**

* Meet all specifications above.
* Design present.

**Design hints:**

* The game should be designed to have classes of **Animal**, **Chicken**, **Cat**, **Dog**, **Pig**, **ResourceManager**, **MacDonald** and **TimeManager**.
* The **main()** function should have a **infinity loop** to handle time, animal status changes and commands sent from Command Prompt.