

# OOP Exam - Blobs

Blobs - slimy little creatures who have been at war for the last 300 years. Write a C# application which supports creating blobs and simulating fights between them.

## Task 1 - Implement the Game Objects

A blob has a **name**, **health** and **damage**.

A blob also has a **behavior**. A behavior is triggered when a blob falls to **less or equal** to **half its initial health**. The following behaviors should be supported:

- **Aggressive Behavior** - doubles the blob's damage. Each consecutive turn the blob loses **5 damage**. The unit's damage cannot fall below its initial value (the damage before the behavior was toggled).
- **Inflated Behavior** - The blob gains **50 health**. Each consecutive turns the blob loses **10 health**.

A behavior can only be triggered **once**. It should be triggered even if the blob falls to 0 health. If it is triggered a second time, an error should be raised.

A blob can **attack** another blob. The following attacks should be supported:

- **Putrid Fart** - the blob produces an attack with **damage** equal to its **own damage**
- **Blobplode** - the blob loses **half its current health** (e.g. from 55 health loses 27 health = 28 health left) and produces an attack with **damage** equal to **double its own damage**
  - The blob cannot fall below 1 health from attacking with Blobplode

A blob can perform an attack multiple times (only once per turn). A blob can have only a **single attack** (either Putrid Fart, Blobplode or any other attack) and a single behavior (either Aggressive, Inflated or any other behavior).

## Other Notes

- If a blob's attack **triggers a behavior**, the behavior should be applied **immediately** (i.e. a **behavior triggered by an attack** can affect the **attack** that triggered it)
- A blob should not fall below **0 health**
- **Dead blobs** cannot attack / be attacked

## Task 2 - Flexible Blobs

Design the blobs so they can work flexibly with **any behavior** and **any attack**.

## Task 3 - Improve the Models

Encapsulate all internal behavior. The implemented classes should not reveal any internal logic.

Avoid code repetition and promote code reusability by applying the good practices of OOP.

## Task 4 - Application Logic

From the standard input you will receive **commands**, each on a separate line. The application should support the following commands:

- **create <name> <health> <damage> <behavior> <attack>** - adds a new blob with the specified behavior and attack

- **attack** <attacker> <target> - forces a blob to perform an attack on another blob

The **attacking blob** produces an **attack** that deals damage to the **target blob's health**.

- **pass** - does nothing, skips the turn and progresses the game
- **status** - prints data about the current state of the game in the following format:

```
Blob {name}: {health} HP, {damage} Damage
...
```

Blobs should be printed in order of entry in the game.

If a blob has been killed, the format should instead be:

```
Blob {name} KILLED
```

- **drop** - ends the program

Each command should progress the game with **1 turn** after it is executed.

## Task 5 - Loose Coupling

The application should support the creation of blobs with **any behavior** and **attack**.

## Task 6 - Input / Output Independence

The application should be designed to work with **any input source** and **output destination**. In other words, it should **NOT** depend on the console.

## \* Bonus Task 7 - Blob Events

Implement a fifth command:

- **report-events** - if passed as **first command** in input the engine should **print detailed information** when blobs attack each other:
  - When a blob toggles its behavior

```
Blob {name} toggled {behavior-type}
```

- When a blob is killed (its health drops to 0 after all effects are taken into consideration)

```
Blob {name} was killed
```

The blobs should **NOT** directly interact with the engine or any input/output classes.

This task is not part of the automated tests in the Judge system.

## Input

The input will be read from the standard input. On each line a command will be given (one of the described above).

## Output

The output should be printed on the console. Upon receiving the **status** command, print the current status of the game as described above.

## Constraints

- The **health** and **damage** will be valid 32-bit integer numbers
- The input will always end with the **drop** command
- The **report-events** command will always come first if present in the input

## Examples

| Input                                                                                                                                                           | Output                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| create Cenko 30 15 Inflated PutridFart<br>create Boko 50 20 Aggressive Blobplode<br>attack Boko Cenko<br>status<br>status<br>status<br>status<br>status<br>drop | Blob Cenko: 50 HP, 15 Damage<br>Blob Boko: 25 HP, 40 Damage<br>Blob Cenko: 40 HP, 15 Damage<br>Blob Boko: 25 HP, 35 Damage<br>Blob Cenko: 30 HP, 15 Damage<br>Blob Boko: 25 HP, 30 Damage<br>Blob Cenko: 20 HP, 15 Damage<br>Blob Boko: 25 HP, 25 Damage<br>Blob Cenko: 10 HP, 15 Damage<br>Blob Boko: 25 HP, 20 Damage<br>Blob Cenko KILLED<br>Blob Boko: 25 HP, 20 Damage |

| Input                                                                                                                                              | Output                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| create Fiki 90 5 Inflated Blobplode<br>create Jorjo 30 25 Inflated Blobplode<br>attack Fiki Jorjo<br>status<br>attack Fiki Jorjo<br>status<br>drop | Blob Fiki: 95 HP, 5 Damage<br>Blob Jorjo: 20 HP, 25 Damage<br>Blob Fiki: 33 HP, 5 Damage<br>Blob Jorjo: 60 HP, 25 Damage |

| Input                                                                                                                                                                                   | Output                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| create Sir 70 20 Aggressive Blobplode<br>create Stenly 33 15 Aggressive Blobplode<br>create Royce 50 20 Inflated Blobplode<br>status<br>attack Stenly Royce<br>status<br>status<br>drop | Blob Sir: 70 HP, 20 Damage<br>Blob Stenly: 33 HP, 15 Damage<br>Blob Royce: 50 HP, 20 Damage<br>Blob Sir: 70 HP, 20 Damage<br>Blob Stenly: 17 HP, 15 Damage<br>Blob Royce: 70 HP, 20 Damage<br>Blob Sir: 70 HP, 20 Damage<br>Blob Stenly: 17 HP, 15 Damage<br>Blob Royce: 60 HP, 20 Damage |

| Input                                                                                                                                                                                                       | Output                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| report-events<br>create Petya 20 10 Aggressive PutridFart<br>create Emi 30 15 Inflated PutridFart<br>attack Petya Emi<br>attack Petya Emi<br>attack Emi Petya<br>attack Emi Petya<br>pass<br>status<br>drop | Blob Emi toggled InflatedBehavior<br>Blob Petya toggled AggressiveBehavior<br>Blob Petya was killed<br>Blob Petya KILLED<br>Blob Emi: 30 HP, 15 Damage |