



PHP Piscine

Day 08

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Summary:

This document is the day08's subject for the PHP Piscine.

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Chapter I

Foreword

Discover [Warhammer 40000](#).

Chapter II

General Instructions

- Only this page will serve as reference; do not trust rumors.
- Watch out! This document could potentially change up to an hour before submission.
- Only the work submitted on the repository will be accounted for during peer-2-peer correction.
- As when you did C Piscine, your exercises will be corrected by your peers AND/OR by Moulinette.
- Moulinette is very meticulous and strict in its evaluation of your work. It is entirely automated and there is no way to negotiate with it. So if you want to avoid bad surprises, be as thorough as possible.
- Using a forbidden function is considered cheating. Cheaters get -42, and this grade is non-negotiable.
- These exercises are carefully laid out by order of difficulty - from easiest to hardest. We ~~will~~ not take into account a successfully completed harder exercise if an easier one is not perfectly functional.
- You cannot leave any additional file in your repository than those specified in the subject.
- Got a question? Ask your peer on the right. Otherwise, try your peer on the left.
- Your reference guide is called Google / the Internet / <http://www.php.net> /
- Think of discussing on the Forum. The solution to your problem is probably there already. Otherwise you will start the conversation.
- Examine the examples thoroughly. They could very well call for details that are not explicitly mentioned in the subject ...
- By Odin, by Thor ! Use your brain !!!

Chapter III

Awesome Starships Battles In The Dark Grim Future Of The Grim Dark 41st Millenium

	Exercise 00
	Awesome Starships Battles In The Dark Grim Future Of The Grim Dark 41st Millenium
	Turn-in directory : <i>ex00/</i>
	Files to turn in : *
	Allowed functions : Everything. Yes everything. Yes even Javascript if you know how to use it. yes even your framework that knows how to brew coffee.
	Notes : n/a

III.1 No, you are not dreaming

With today's videos, you have just about gone round the whole object syntax of PHP. But in reality, you have had to write only about 15 classes that are dueling without any real purpose since the exercises were dictating to you the classes to create and what to put in them. Today, you will have to decide for yourself what classes to create and how to make them interact.

We are not trying to assess today whether you are able to write a class, an interface or a trait. Nope. Today, we want to determine if you are able to implement what you have learned. Which is why instead of having the usual daily tests, you will have only one exercise for which you will be free to develop and implement your program however you see fit.

Why authorize everything? Because OOP isn't a technology. It's a way of coding and you must be able to make it your own and code no matter what the technology is. If you are drowning in one or more extremely complex frameworks for today, or in the labyrinth of JavaScript, it is your problem. We want a program that works with a relevant OOP use. The rest isn't our problem today.

III.2 Instructions

- This is a PHP project. Don't give us Python, Ruby or anything else since you think you are allowed "everything". Not only, it isn't funny and it will be worth 0.
- Your program needs to work on Chrome with the version installed on the iMacs.
- A minimal effort is required on the aesthetic front. Use CSS and some images.
- The one or multiple url of your application are up to you.
- No matter which technology you choose, it is your responsibility that during your defence everything required is available on your repository and on your computer and you will not be allowed to push or install 30Gb of framework.
- Each d06, d07 and d08 video presents a concept. Each of these concepts **MUST** be presented at least once in your submitted project, with the exception of reflection API that you may choose to use or not. On top of which the use of each of these concept **MUST** be relevant. Your corrector could refuse to give you any points for a concept that you used badly or that is useless. The syntax of object of JavaScript obviously **does not** count in this account.
- One unique Class per file only.
- One file that contains the definition of a class cannot contain any other, except for `require` or `require_once` if necessary.
- A file containing a class must **ALWAYS** be named `ClassName.class.php`.
- A class must **ALWAYS** be accompanied by a documentation file whose name **MUST** be `ClassName.doc.txt`. It will not be a mistake to copy/paste d06.
- A Class documentation must **ALWAYS** be useful and match the implementation.
- A class must **ALWAYS** have a static method called `doc` returns the documentation of a class into a string.
- An attribute or public method that wasn't needed will result in you being graded 0 for the day. Be clever with the visibility and prove that you know how to use it.
- If we cannot say tha one of your child Classes "is a" parent Class in an (`extends`) inheritance, your concept is wrong. You will then be graded 0 for the day. Be meticulous.
- This is more an advice than a recommendation: big and incomplete is bad. Small and complete is better.

III.3 The subject!

You will have to write a turn by turn space combat game using the Warhammer 40000 universe (SciFi Universe invented by Games Workshop). The rules are simple but not trivial to have minimal fun. For those who know, the rules will be freely inspired by the game Dreadfleet from the same company. Actually all rights reserved to Games Workshop etc.

Awesome Battleships Battles is a 2 players game that allow them to control a fleet of awesome spaceships that fight it out for a very good reason that you are free to invent. The goal is to eliminate the adversary fleet first.

III.3.1 The dice

- The game uses ordinary 6 faces dice that we will refer as D6 to make it short from now on.
- To throw one die is shortened with 1D6. Throwing a 3 is 3D6. Etc.
- Obtaining 3, 4, 5 or 6 on 1D6 is shortened with 3+. Etc.

III.3.2 The game zone

- The game zone is a grid of 150 by 100 cells.
- Both enemy fleets start from opposite corners and all the spaceships are stationary.
- There must be a few obstacles (asteroids or space stations for example). Up to you which obstacles you include. The goal is to block the movements of the spaceships and to break the lines of fire to encourage maneuvers. The board cannot be filled with obstacles. 5 or 6 obstacles of about 10 cells each will do. You can of course adapt these values to your liking.
- The position and the size of the obstacles do not have to be random if you do not wish to spend more time on it.
- A spaceship that is out of bounds or that bumps into an obstacle for any reason is eliminated.

III.3.3 The turns

- Each turn, players play with one of their ships one after the other until all ships have played.
- When one plays a ship it's called "activated".
- We can only activate one ship once per turn.
- Activation is irreversible.
- An active ship must realize three mandatory phases and always in this order:
 - Order phase
 - Movement phase
 - Shoot phase
- Once all the spaceships of both players have been activated, a new turn starts.

III.3.4 Spaceships

- A spaceship is defined by a few features

Name : The name of the vessels **MUST** be badass, like "Wrath Of The Righteous" "Rightful Vengeance" or "Smite Of Terra" for the imperial ones, "Megacrusha" for Orks, or even "Bane Of All Hope" for Chaos for example.

Size : Define a width and lengths in cells of a Spaceship. A Spaceship 3x10 is a very big admiral ship. A ship 1x2 is a small light one, a "scout". An average one will be 1x4 cells.

Sprite or equivalent : The representation of the ship on the grid.

Hull points : life points of the ship. If those fall to 0, the ship is destroyed. 5 points is a good average for a mid-sized ship.

Engine power : The engine power gives the ship a number of points that the players will be able to attribute to different actions when activating a ship depending on situations. Those will be "power points" shortened with PP. Those points can be spent to make the ship go faster, strengthen its shields or use its weapons. This attribution is done during the order phase which will be detailed later. 10PP represents an average for a basic ship and will be the most common value. The biggest vessels can go up to 15PP.

Speed : Maximum number of cells that the ship can move each turn. This specificity can be raised with the support of PP. A scout who is faster, can move up to 20 cells. A big ass one can only go 10.

Handling: Number of cells that a ship that moved on the prior turn needs to travel straight this turn if he wants to stay stationery for the next one (inertia really). It's also the minimum number of cells that a ship can go straight

before he can turn to the right or to the left AND between each turn. A stationary ship can make a free turn before starting to move at the beginning of the movement phase. A light and nimble scout will have a handling of 2 or 3. A big ship will have a handling of 5 for example.

Shield: Number of damage points that a ship can endure before losing his hull points. Worth 0 upon activation of the ship and can receive PP points.

Weapons: List of weapons that each ship owns, generally one or two, sometimes more for the really big ships. Each weapon needs PP to function. Each PP attributed to a weapon will allow it to raise its efficiency shooting factor for that turn. A section will be dedicated to the weapons and their specificities.

Some weapons will be able to have some special bonuses that will modify their specificities or action range.

III.3.5 Les phases

The activation of a spaceship will give access to 3 different phases that must always be played in this order:

The order phase

At the beginning of this phase, all the PP spent on the prior turn are back to zero. Which means that the weapons systems, shields and speed will be back to their initial values.

The player will now spend the PP of the ship on one or the other of the ship's systems according to the situation. He can spend all its points, some of them or none.

- 1PP spent on speed allows to move 1D6 more space.
- 1PP spent on shields give 1 shield point.
- 1PP spent on weapons gives 1D6 more to shoot with it.

The players can also spend his PP to fix his ships. To repair a ship, the ship must be stationary. Each PP spent in repair allows to roll 1D6. On a 6, a hull point is restored up to the maximum starting value.

The movement phase

During this phase, a ship can move.

- We define a turn as "turning the ship 90 degrees to the right or to the left".
- The ship will rotate around the most central cell that compose that ship.
- A stationary ship can do a free turn before he starts to move.*
- A ship can only move at maximum the number of cells matching its given speed (with the additional PP spent on speed for the turn).
- A ship must always move to an equal or superior amount of cells matching its given handling.
- If during the last turn a ship has moved exactly the amount of cells corresponding to its given handling, the ship can stay stationary this turn.
- A stationary ship can stay that way as long as wanted.
- A Stationary ship can move a number of cells inferior to its given handling. It's the only case where it is allowed to move less cells than its given speed. If it does that the ship won't be considered stationary on next turn.
- A ship can make a turn each time it has moved a bigger or equal number of cells than its given handling.
- A ship that hits another one will immediately stop and can no longer move or shoot for that turn. It will be considered stationary at the beginning of the next turn. Furthermore, if it moved a number of boxes strictly greater than its given handling, each ship will receive a number of damage points equal to the number of hull points that the other ship had prior to impact. Those damage points can be absorbed by shield points. In that case we are talking about "buccaneering". It's a risky maneuver, quite desperate really but it can lead to some spectacular situations.
- A ship that hits an obstacle or that goes out of bounds is eliminated and considered destroyed.

Shooting phase

It's the phase where serious stuff can start. Imagine spaceships many kilometers wide, shooting each other with weapons the size of buildings... Special effects guaranteed.

Every weapons have a specific profile defined as such:

Charge: Initially 0 upon activation of the Spaceship. Each PP spent on that weapon for that turn adds 1 charge point. Each charge point gives 1D6 for the shooting with that weapon. Some weapons have a number of charge points by default always available that allows to shoot even if no PP was used for that weapon for that turn.

Short Range: Number of cells the weapon can reach short range.

Middle Range: Number of cells the weapon can reach middle range.

Long Range: Number of cells the weapon can reach long range. Also maximum range for the weapon to be used..

Effect Zone: Description of the cells on which the weapon can shoot..

To shoot, a ship must have a clear view of its target. Any ship or obstacle can block that target view. To check the target view, we need to be able to trace a line between the shooter and its target without any obstacle. If the shooter has acquired a clear target, the ship will throw the dice equal to the number of charge points the weapons has. Of course the target must be within its effect zone and its weapon range. The dice obtaining at least able specific value are considered "a success". The basic value to obtain to win are as follows:

Short range: 4+

Middle range: 5+

Long range: 6

Each win will provoke a damage point on one or many targets. The damage points are first deducted to the target's shield, then to its hull points.

Each weapon can only shoot once per turn. Of course, a ship can decide not to shoot. Furthermore some weapons can force the ships to be stationary to be able to shoot. Those weapons are usually powerful long range guns. Some weapons are also able to modify the value to obtain from 1D6 to provoke success.

A shoot that reaches its target from the front or the back provokes an "enfilade shoot". An enfilade shoot will pass through a ship lengthwise bringing on catastrophic damages. To represent that case, a ship that shoot an enfilade shoot will reduce by 1 the value required on 1D6 to obtain success.

III.3.6 Weapons examples

- Side laser batteries

Charge: 0

Short Range: 1 to 10 cells

Middle Range: 11 to 20 cells

Long Range: 21 to 30 cells

Effect Zone: The ship's width for the first cell, plus 1 width cell more at the front and back of the ship per cell away from the ship. The ship can choose to shoot either from the left or from the right at each use. The drawing will be more clear. The 'X' represent the ship and the '.' the effect zone.



- Nautical lance

Charges : 0

Short Range: 1 to 30 cells

Middle Range: 31 to 60 cells

Long Range: 61 to 90 cells

Effect Zone: A straight line or column 1 cell wide that start from the front of the ship.

- Heavy nautical lance

Charges : 3

Short Range: 1 to 30 cells

Middle Range: 31 to 60 cells

Long Range: 61 to 90 cells

Effect Zone: A straing line or columns of 1 cell wide that start from the front of the ship.

Special: The shooter must be stationary to be able to shoot. Furthemore, as long as the shoot destroys its target, the dice can be thrown again to attempt to destroy a target located behind the original one as long as the maximum range of the weapon isn't reached.

- Close range super heavy automatic weapon

Charges : 5

Short Range: 1 to 3 cells

Middle Range: 4 to 7 cells

Long Range: 8 to 10 cells

Effect Zone: Any cell within range.

- Macro canon

Charges : 0

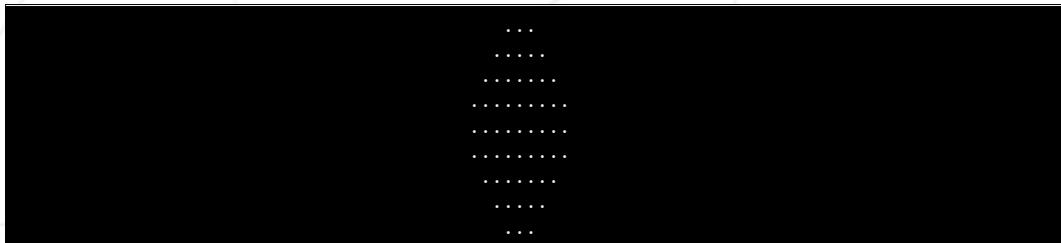
Short Range: 1 to 10 cells

Middle Range: 11 to 20 cells

Long Range: 21 to 30 cells

Effect Zone: A straight line or columns of 1 cell wide that start from the front of the ship.

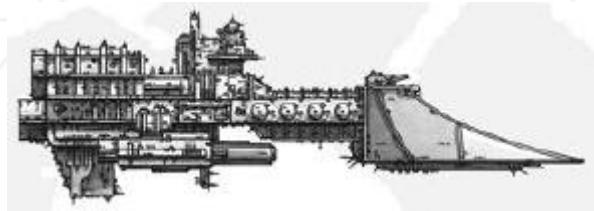
Special : The explosion of the amo reaches multiple boxes. The center of the explosion is located on the closest target's hit cell from the shooter. The explosion covers "a circle" of 9 cells:



Each target covered, even partially by the "circle" receives a number of damage points matching the dice throw. Useful to vaporize the fleet of fast little scouts.

III.3.7 Ships examples

- Imperial Frigate



Name: "Honorable Duty"

Size: 1x4 cases

Hull points: 5

PP: 10

Speed: 15

Handling: 4

Shield: 0

Weapons: Side laser batteries

- Imperial Destroyer



Name: "Sword Of Absolution"

Size: 1x3 cases

Hull points: 4

PP: 10

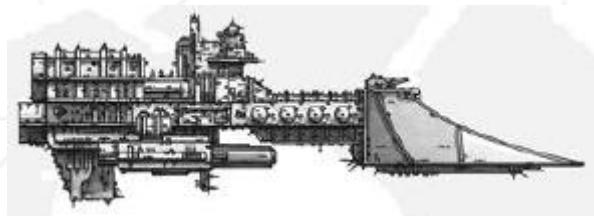
Speed: 18

Handling: 3

Bouclier : 0

Weapons: Side laser batteries

- Imperial Frigate



Name: "Hand Of The Emperor"

Size: 1x4 cases

Hull points: 5

PP: 10

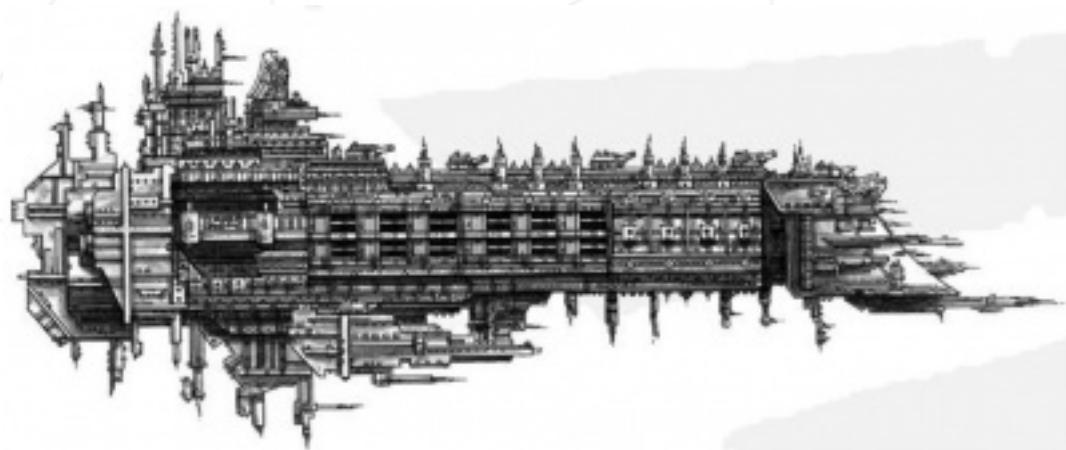
Speed: 15

Handling: 4

Bouclier : 0

Weapons: Nautical Lance

- Imperial Ironclad



Name: "Imperator Deus"

Size: 2x7 cases

Hull points: 8

PP: 12

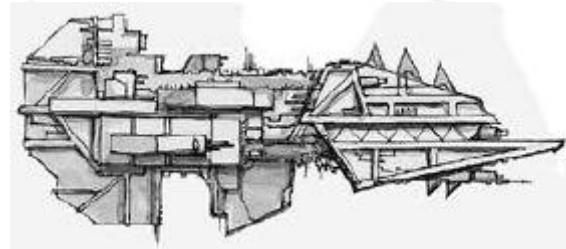
Speed: 10

Handling: 5

Bouclier : 2

Weapons: Two Nautical Lances

- Onslaught Attack Ship



Name: "Orktobre Roug"

Size: 1x2 cases

Hull points: 4

PP: 10

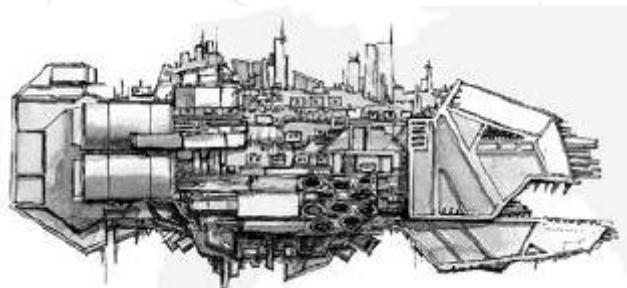
Speed: 19

Handling: 3

Bouclier : 0

Weapons: Side laser batteries

- Terror Ship



Name: "Ork'N'Roll !"

Size: 1x5 cases

Hull points: 6

PP: 10

Speed: 12

Handling: 4

Bouclier : 0

Weapons: Close range super heavy automatic weapon - Makro Kanon

III.4 Additional comments

- Discuss with your peers to get their opinion of the best way to use this or that notion of OOP in PHP for this exercise. The composition of this game is perfect for it..
- Prioritise a limited – but playable version - of the game rather than being tempted to do it all and finish nothing. Your objective is to practice OOP, not to code an extraordinary game (Even if we'd be happy if you did that).
- To have two identical ships that can move on an empty grid and be shot at with an identical weapon is the strict minimum.
- An average game will see 2 fleets of equal strength composed of 5 to 10 ships each.
- Don't hesitate to post on the forum your weapon and/or vessels proposals. The Warhammer 40000 world has a lot of terrible factions and has even more terrible and numerous weapons. This way you will raise easily that way the level of your game.
- You can modify some parameters of the game as long as they do not modify the nature of the rules and Warhammer 40000's universe.
- The provided illustrations come from <http://wh40k.lexicanum.com/>. All rights reserved to all concerned etc.
- For the Emperor.