Refactoring the Bad Boids

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Code of the module MPHYG001

Smells

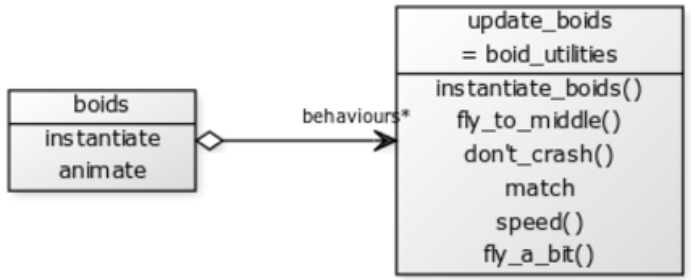
Lists by name the code smells identified refactorings used, making reference to the git commit log [2 marks]

Smell	Refactor	Commit message
Raw numbers appear in your code	Replace magic numbers with constants Replace constants with a configuration file	parameters to config file, added non-standard initiation tests first refactor of match_speed
Fragments of repeated code appear	Replace repeated code with a function	refactor velocity update, first refactor of match_speed
Code needs a comment to explain what it is for	Change of variable/function/class name	refactor flee neighbours, refactor fly_to_middle, + many others
An expression becomes long		refactor flee neighbours
Loop variable is an integer from 1 to something	Replace loop with iterator	
It feels like surely someone else must have done this at some point	Replace hand-written code with library code	used np.random and added x min max test. works ok
A function needs to work corresponding indices of several arrays:	Replace set of arrays with array of structures	
You need to change your code file to explore different research scenarios		parameters to config file, added non-standard initiation tests
A global variable is assigned and then used inside a called function:	Replace global variables with function arguments	use global variables
Two neighbouring loops have the same for statement	Break a large function into smaller units	refactor flee neighbours
A function or subroutine no longer fits on a page in your editor	Separate code concepts into files or modules	moved functions to boid_utilities
A line of code is indented more than three levels	Separate code concepts into files or modules	moved functions to boid_utilities
A piece of code interacts with the surrounding code through just a	Break a large function into smaller units	refactor flee neighbours refactor velocity update

few variables		first refactor of match_speed
You find it hard to locate a piece of code	Break a large function into smaller units	refactor flee neighbours refactor velocity update first refactor of match_speed
You get a lot of version control conflicts		

UML

Includes a UML diagram of the final class structure [1 mark]



Refactoring

Discusses in your own words the advantages of a refactoring approach to improving code [1 marks]

Refactoring makes code easier to read, understand and maintain. The many small changes add up to much more user-friendly code which is much easier to use. Debugging becomes simpler. It's often difficult and sometimes impossible to write unit tests for code which hasn't been well refactorer because the code isn't broken down into discrete pieces each with its own function.

Problems

Discusses problems encountered during the project [1 mark]

There wasn't always a 1:1 relationship between the smell / refactor and the commit. I.e. many commits dealt with multiple issues.
Absolute referencing to import the .yml files broke when improving the directory structure. Fortunately the os.path.join function allows '..' as part of the path.