

Assignment 4

2020/01/24

Exercise 2:

- Register and Login classes:

Before:

1	Register					144	low-medium	high	medium-high	low-medium
2	Login					127	low	high	medium-high	low-medium

After:

ID	CLASS	COUPLING	COMPLEXITY	LACK OF COHESION	SIZE	LOC	COMPLEXITY	COUPLING	LACK OF COHESION	SIZE
1	Register					131	low	high	low-medium	low-medium
2	Login					122	low	high	low-medium	low-medium

Register and Login class both make a use of displaying notifications when data is invalid. This allowed us to apply extract method metric, which reduced Lack of Cohesion from “medium-high” to “low-medium” once method generateNotification() was moved to ValidatorService class.

- GameOver class:

Before:

ID	CLASS	COUPLING	COMPLEXITY	LACK OF COHESION	SIZE	LOC	CB0	CB0 APP	CB0 LIB	RFC
1	GameOver					106	25	0	25	48

After:

ID	CLASS	COUPLING	COMPLEXITY	LACK OF COHESION	SIZE	LOC	CB0	CB0 APP	CB0 LIB	RFC
1	GameOver					113	25	0	25	49

This was not the biggest improvement since only the size of methods were reduced to increase cohesion, but the reason for that is that the GUI classes rely on object like Labels, Buttons, Tables, Stages in order to display all these objects in our game. It was possible to extract logic components from the constructor method and make it more granular, thus increasing cohesion of the class.

- Snake class:

Before:

ID	CLASS	COUPLING	COMPLEXITY	LACK OF COHESION	SIZE	LOC	COMPLEXITY	COUPLING	LACK OF COHESION	SIZE
1	Snake					86	low-medium	medium-high	low-medium	low-medium

Name	Complexity	Coupling	Size	Lack of Cohesion	CBO	RFC	SRFC	DIT	NOC	WMC	
Snake	low-medium	medium-high	low-medium	low-medium	12	30	16	1	0	33	86
Snake(Texture, T	low	low-medium	low	low	5						
ateFood(Food): low		low	low	low	3						
final addBody(T) low		low-medium	low	low	4						
getHead(): Rotat	low	low	low	low	1						
getSnakeBody(): low		low	low	low	0						
getTail(): Rotat	low	low	low	low	1						
hasCollided(Boa	low-medium	low-medium	low	low	4						
moveBody(): ve	low	low	low	low	1						
moveOnKeyPres	low	low-medium	low	low	5						
render(SpriteBat	low	low	low	low	3						
transient head : f											
transient snakeB											
transient tail : Bo											

After:

ID	CLASS	COUPLING	COMPLEXITY	LACK OF COHESION	SIZE	LOC	COMPLEXITY	COUPLING	LACK OF COHESION	SIZE
1	Snake					70	low-medium	low-medium	low-medium	low-medium

Name	Complexity	Coupling	Size	Lack of Cohesion	CBO	RFC	SRFC	DIT	NOC	WMC
Snake	low-medium	low-medium	low-medium	low-medium	10	31	16	1	0	25
Snake(Texture, T) low		low-medium	low	low	4					
ateFood(Food): low		low	low	low	3					
final addBody(T) low		low	low	low	3					
getHead(): Rotat low		low	low	low	1					
getSnakeBody(): low		low	low	low	0					
getTail(): Rotat low		low	low	low	1					
hasCollided(Boa low-medium		low-medium	low	low	4					
moveBody(): vo low		low	low	low	1					
moveOnKeyPres low		low	low	low	1					
render(SpriteBat low		low	low	low	3					

We chose to focus on the CBO metric as improving this metric in specific methods will also improve the class score. The CBO metric means the 'Coupling between object classes'. This metric applies both to methods and classes, and by refactoring the methods the class' score also improved. For the Snake class refactoring, we used the Extract class technique, by introducing the new class 'Movement'.

- UserDao, ScoreDao, MySqlConnection classes:

Before:

List of all classes (#3)

ID	CLASS	COUPLING	COMPLEXITY	LACK OF COHESION	SIZE	LOC	COMPLEXITY	COUPLING	LACK OF COHESION	SIZE
1	UserDao					116	low-medium	low	low	low-medium
2	ScoreDao					84	low-medium	low	low	low-medium
3	MySQLConnector					11	low	low	low	low

After:

List of all classes (#4)

ID	CLASS	COUPLING	COMPLEXITY	LACK OF COHESION	SIZE	LOC	COMPLEXITY	COUPLING	LACK OF COHESION	SIZE
1	UserDao					116	low-medium	low	low	low-medium
2	ScoreDao					67	low	low	low	low-medium
3	LeaderboardDao					26	low	low	low	low
4	MySQLConnector					11	low	low	low	low

We extracted method to get top 10 scores from the database in ScoreDao class to the new class called LeaderboardDao. This provides more logical separation of concerns, reduces complexity, class sizes and lines of code in the classes.