GRIFFITH COLLEGE DUBLIN

Assignment Cover Sheet

Student name: Ana Trevisan / Deborah Rimei / Aleksandar Mladenov

Student number: 3014953 / 3015579 / 2916196

Faculty: Computing Science

Course: BSc (Hons) Computer Science   **Stage/year:**   1st year

Subject: Software Development 1

Study Mode: Full time _____   Part-time   x _____

Lecturer Name: Gemma Deery

Assignment Title: Milestone Review 3

No. of pages: _____

Disk included?   Yes   No (x)

Additional Information: (ie. number of pieces submitted, size of assignment, A2, A3 etc)

Date due: 27/04/2020

Date submitted: 27/04/2020

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Signed: *Ana Trevisan, Deborah Rimei, Aleksandar Mladenov*   **Date:** 27/04/2020

***Please note:** Students **MUST** retain a hard / soft copy of **ALL** assignments as well as a receipt issued and signed by a member of Faculty as proof of submission.*

GRIFFITH COLLEGE

Course and Module Information	
Academic Year	2020
Semester	2
Course	BSCH
Year	1
Module	Software Development 1
MILESTONE	REVIEW 3

Instructions
a. **Fill in your details in the box provided below.** b. **Answer the questions including screenshots where appropriate.**

Student Information	
Student Name	Ana Trevisan / Deborah Rimei / Aleksandar Mladenov
Student Number	3014953 / 3015579 / 2916196
Code Review #	3

Plan
(20%)

Please state the design objectives for your Robocode project.

Based on our research we decided that the robot should implement at best the functions assigned in the recommended project. In the beginning it should be a good all-round robot and, at a later stage, we will focus on a specialization.

We divided the six following methods amongst ourselves but everyone will remain open to advice or new ideas from others on the methods assigned.

The original plan can change over the revisions so Cappuccino can evolve and all modifications in the plan will be documented in this section.

As per system requirements, we plan to implement the methods to Cappuccino as following:

RUN_METHOD - main owner Deborah
The robot will change its movements after a specific turn (tick) tracked by the variable tickCounter.

*added the method in review 2 **AVOID_WALLS** - main owner Deborah
The method checks when the robot is close to the wall and it avoids it by directing the robot toward the center of the field.

*added the method in review 2 **MOVE_TOWARDS_CENTER** - main owner Deborah
Used to direct the robot toward the center of the field.

ON_HIT_BY_BULLET_METHOD - main owner Deborah
If the robot gets hit by a bullet it will try to identify from where the bullet came from and escape in the opposite direction. In the third review the plans for functionality changed and now we try to escape in the perpendicular direction of the bullet when we have more than 2 enemies in the field. This strategy is good to avoid staying in the middle of a crossed fire.

ON_SCANNED_ROBOT_METHOD - main owner Ana
The radar scans robots up to 1200 units away and this event is automatically called if there is a robot in range of radar. The plan is to use this function to target other robots and, from this, calculate our robot's movement and plan an attack or an escape. This way, our movement will not be random.

ON_BULLET_HIT_METHOD - main owner Ana
This method is called when one of your bullets hits another robot. Cappuccino continues hitting the robot when one of its bullets hits a robot . The plans for this method were updated in the third review. Now besides continuing hitting bullets, in this method (and also in other methods that interact with enemies such as onScannedRobot, OnHitRobot, and OnHitbyBullet) we update a hashmap that stores our enemies' energy. This implementation enables Cappuccino to know how many enemies it has in the field and their energy values.

ON_HIT_WALL_METHOD - main owner Alex

Enable Cappuccino to recover from hitting a wall on a random pattern and direction to not have a predictable path.

ON_HIT_ROBOT_METHOD - main owner Alex

In the first review plan If Cappuccino gets hit it back away on a random pattern to not be predictable. In the second review, the plan changed and the ramming functionality was implemented at this method. If Cappuccino hits an enemy it checks if the enemy's energy is low or high. If it is high, Cappuccino tries to escape. If it is low, Cappuccino goes against and rams the other robot.

Modifications
(20%)

Please list the changes that have been made to your Robocode since your last code review in bullet-point format (one sentence each), including a screenshot of the output from the command: *git log --reverse*

For the first review:
- **A git log --reverse of the first review:**

```
de12@LAPTOP-NRQKOA1Q MINGW64 /c/robocode/robots/cappuccino ((1de85ec...)|MERGING)
$ git log - reverse
fatal: ambiguous argument 'reverse': unknown revision or path not in the working tree.
Use '--' to separate paths from revisions, like this:
'git <command> [<revision>...] -- [<file>...]'

de12@LAPTOP-NRQKOA1Q MINGW64 /c/robocode/robots/cappuccino ((1de85ec...)|MERGING)
$ git log --reverse
commit 652fe7f1ad99a9ffa7d8d8b5c6a350f4f19e4b65
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:   Wed Mar 11 21:05:59 2020 +0000

    skeleton of cappuccino

commit d16718eff1a3fceaa535f1d1a176e01ba350f28e
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:   Sun Mar 22 14:43:43 2020 +0000

    changed the color of the robot

commit 4064a59dac8163610284e616e87934a5b41b5a54
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:   Sun Mar 22 14:44:15 2020 +0000

    changed color of the robot

commit d6a439ada4e5aa6bda4d2fb6b46cd705d8a923b2
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:   Sun Mar 22 16:48:59 2020 +0000

    An update to Cappuccinos Code

commit e734d4fb86908b2b5848833c79bccd670283f5e0
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:   Sun Mar 22 19:24:37 2020 +0000

    changed bullet s color
```

- First we added the methods required

- **RUN_METHOD** - Cappuccino is moving following a specific pattern that consists in changing the velocity and the deg of turn.

- **ON_HIT_BY_BULLET_METHOD** - At the moment when the bullet hits cappuccino it set the turn to 5 deg

- **ON_SCANNED_ROBOT_METHOD** - Added a functionality just to test.

- **ON_BULLET_HIT_METHOD** - Didn't add functionality to this method yet.

- **ON_HIT_WALL_METHOD** - Makes the robot turn in a random pattern. There are 4 possible options: it will either turn right or left and move ahead or it will move back and then turn right or left. All of the turns get adjusted by a random angle factor and the turning away and direction is also random to avoid any patterns.

- **ON_HIT_ROBOT_METHOD** - No amended functionality as for now.

For the second review:

- **A git log --reverse of the second review:** (A sample screenshot because we had more than 30 commits so they were copied and pasted in the last milestone review)

```
commit a9cbdf9d4104d75dfb567a62d82dbf7c417ecb12
Merge: d6a439a e734d4f
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Sun Mar 22 19:31:13 2020 +0000

    Merge branch 'deborah' into 'master'

    changed bullet s color

    See merge request Mladenov/cappuccino!1

commit d050ae6d54e98e06312c43f91a35bda88c3a7c71
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Mon Mar 23 17:26:02 2020 +0000

    added movement

commit b7bfbbba0a6e61bc392ef0485d6abb4ac56d4396
Merge: 6f8b34b a9cbdf9
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Mar 23 14:29:05 2020 -0300

    merged with master

commit a0e457c4d8f08dc7f0071c9df5c765c5c3d69a3a
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Mon Mar 23 19:48:32 2020 +0000

    commented the code

commit 56cb0ddb78049b7737929c40f407d2789c3d2aab
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Mar 23 19:54:32 2020 +0000

    Changes to cappucinos on hit wall method

commit 1de85ec708d704699fd3f1aa19053fa779cc6309
Merge: a0e457c a9cbdf9
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Mon Mar 23 19:54:55 2020 +0000

    Merge commit 'a9cbdf9d' into deborah

commit a0465c5157caa537fc0164aad8e4db7f04153240
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Mar 23 20:16:00 2020 +0000

    Update Cappuccinos on Hit Wall methodd
```

```
commit a0465c5157caa537fc0164aad8e4db7f04153240
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Mar 23 20:16:00 2020 +0000

    Update Cappuccinos on Hit Wall methodd

commit 4044ad7d6c7c2fc1657f08159c2a6a6177acf179
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Mar 23 17:37:06 2020 -0300

    onBulletHit added

commit 33c9d83abdf11462e9fa9961888f2e630071204e
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Mar 23 20:49:27 2020 +0000

    Update Cappuccino.java

commit 46f520d517d5ec683b3fac18edc195f6be9a40af
Merge: 56cb0dd 33c9d83
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Sun Apr 5 21:14:13 2020 +0100

    Some change

commit 7529f3692c63732cf662bd2c6d23ac96e18be7e4
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Sun Apr 5 23:22:24 2020 +0100

    Update Cappuccino.java

commit f6c7f248f9c574c98b6c0932a6f9a9acd52fe60e
Merge: 46f520d 7529f36
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Apr 6 00:06:42 2020 +0100

    Merge branch 'master' into 'alex'

    Master

    See merge request Mladenov/cappuccino!4
```

```
commit 62a282d112151475dffb5d278a95949a0d41398e
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Apr 6 00:10:22 2020 +0100

    Update Cappuccino.java

commit decca84fa654ffa24405d0787d4139269de2e876
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Wed Apr 8 19:39:23 2020 +0100

    included cappuccino properties

commit 5936e64fe1afd00a8a7b36e5cbf174cfe50a8751
Merge: decca84 7529f36
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Wed Apr 8 19:48:21 2020 +0100

    Merge branch 'master' of http://gitlab.gcd.ie:8080/Mladenov/cappuccino

commit 8656f4564884cc4dcb69f5dbf4894bcfe9955c11
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Sat Apr 11 20:09:02 2020 +0100

    added code to avoid the wall

commit 45fd44da52e7bb368db131afa3e7ad64fd4511d7
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Sat Apr 11 20:36:00 2020 +0100

    added code to move towards center

commit 20c709c0a5e604bb83d9765d0bb0cc614e68cef7
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Sat Apr 11 22:10:07 2020 +0100

    avoid wall method works - to fix bug when shooting

commit 615185ff50dff314a3f6328f7132983fb8d5268e
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Mon Apr 13 10:47:34 2020 +0100

    avoid walls method works
```

```
commit 824d7a7092ccfc847c71ed84c0a46ef0fb388369
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Mon Apr 13 12:44:54 2020 +0100

    solved the issue of avoiding wall after shooting

commit b79f32a36af0e73cd2f378401947280264375a23
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Mon Apr 13 18:17:14 2020 +0100

    Delete Cappuccino$1.class

commit a67425b928641f38e3359fad5aa4f07260a92a57
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 14:28:42 2020 -0300

    new onScannedRobbot and new onBulletHit

commit 3f91e1c96878affd0a45ea11e35a11b4dbe82aeb
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Apr 13 18:29:46 2020 +0100

    removed direction choice from hit wall

commit 1cdd73f58fb2d50b5f45dcc61b919f8120b704db
Merge: 3f91e1c 62a282d
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Apr 13 18:46:59 2020 +0100

    commit

commit 645c0d53a5496f6cb82cbe39f2fbb641e4f39123 (origin/alex)
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Apr 13 18:56:16 2020 +0100

    onHitWall method in % and updated onHitRobot

commit 97699fe53d2846e7f461f3ae8b666728fae6fb40
Merge: 645c0d5 b79f32a
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:    Mon Apr 13 19:03:25 2020 +0100

    resolving merge conflicts
```

```
commit b44c47dca6840ed615d319948c5f0f25b6afa094
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 15:06:41 2020 -0300

    fixed identation

commit 9b65d2779556866e8b9a48720b374168778ac3ef
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 15:16:56 2020 -0300

    resolving conflicts

commit a60e4e3ef163d4b050922df347b74ce21b73cd08
Merge: 9b65d27 97699fe
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 15:41:35 2020 -0300

    merged with alex, ana and deborah

commit ed43c8f0db343ada6ca104671c3bd4813a4731ca
Merge: b44c47d a60e4e3
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 15:47:11 2020 -0300

    conflicts

commit 1943c7563d59ad04c0b9c0e51ca21293b32f14fa
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 15:51:31 2020 -0300

    imported Relative Angles Degrees

commit 038d147279007900de197fec2ee2d94a97e771d57
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 16:07:16 2020 -0300

    fixed identation and bugs

commit f9104e1e278d90279fb0c8b18488e9289b7dd4fd
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 16:14:18 2020 -0300

    removed onBulletHIt
```

Softv

```
commit 6d43b43fdeca3527688967e6d8f2d2358b2f6c5e
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 16:23:03 2020 -0300

    alex deborah and ana debugs

commit b878f89930722b1b9ca1692400a108ed56267ef6
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 16:24:56 2020 -0300

    removed util.Utils import

commit ec2d90de78551a6d7189cd86efa4c6b04ba4391b
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 16:32:15 2020 -0300

    removed util.Utils import fixed

commit 7a9642b64e4feeb5155499c2924802c7de1f4e5f
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 13 17:42:40 2020 -0300

    started to debug avoid walls method
```

- Implemented improvements to the basic functions and additional methods.

- **ON_SCANNED_ROBOT_METHOD** - When the target has less energy then (Cappuccino - 20), Cappuccino shots with power of 3. When the target has more energy then (Cappuccino - 20), Cappuccino shots with the power of 1.

- **ON_HIT_WALL_METHOD** - Changed the numbers generated randomly from a scale of 1-12 to a percentage based system from 0-100.

- **ON_HIT_ROBOT_METHOD** - Added a method to respond to hits from robots or if we hit a robot. In the case that Cappuccino hits a robot the isMyFault method changes to true and it directly towards him and starts ramming it as well.It Tries to continuously ram them and shoot at the same time.If the opposing robots energy is running low Cappuccino uses shots with less power while ramming in order to kill it by ramming and get the ramming bonus. If a robot hits Cappuccino in turn an isMyFault method is false, Cappuccino responds by turning its shell towards the enemy and responds with an appropriate power shot depending on the angled he was hit from

- **RUN_METHOD** - The movement of the robot remains the same, now in the run method it also checks the position of the robot, calling the method "avoidWalls()".

- **added AVOID_WALLS** - The avoid walls method gets the position of the robot in the x axis and the y axis to see where exactly it is situated. It then checks the height and the width of the battle field. It then checks if the robot is over the safe margin (gave by the buffer percentage).

If the robot is too close to the wall it calls another method to move toward the center of the field.

- **added MOVE_TOWARDS_CENTER:** The method checks where is the center of the field and move toward sit

- **ON_HIT_BY_BULLET_METHOD** - When it gets hit by a bullet it turns to 5 deg to not get in the radar of the robot.

- **ON_BULLET_HIT_METHOD** - Tested in battles but with no positive results. Didn't add functionality to this method yet.

For the third review:

- **A git log --reverse of the third review:**

```
commit d688aa699203a694ec8bb933381dea876d091958
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:   Sat Apr 18 16:37:36 2020 +0100

        •       Changed the ram method which will now only initialise if the enemy r
obot has 20 points or less life than Cappuccino or it will disengage in a parall
el line with increased velocity in the hope to avoid tracking
        •       Changed the buffer size of the avoid wall method from a percentage t
o 140 pixels to avoid disproportionate buffers on smaller or larger maps.
        •       Integrated the avoid wall to Centre method in to the onHitWall metho
d in corners to insure robot doesn't randomly hit another wall.

commit 33eda356b5b3519bd0a5478fda16274ad0bcc88b
Merge: 7a9642b d688aa6
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:   Sat Apr 18 16:40:27 2020 +0100

    Merge branch 'alex1' into 'master'

    Various changes and debuging on multiple methods

    See merge request Mladenov/cappuccino!5

commit c1fd341f7bfacfd4b3bfaf54cce31512bf808054
Author: Aleksandar <aleksandar.mladenov@student.griffith.ie>
Date:   Sun Apr 19 14:52:43 2020 +0100

    Switched the targeting with a temporary clause to fix logic issue

commit 4f36ad49091a64ca4fb5e5f2037fab9451a07e2a
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:   Wed Apr 22 21:08:39 2020 +0100

    the radar keep turning radar

commit a402ee87cd90d6ae987042195e8b678f2d78cae3
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:   Wed Apr 22 21:13:15 2020 +0100

    changed the buffer to avoid the wall to 40
```

```
commit c020a02ce5980d5ce00e40a20922d37da42b672a
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Wed Apr 22 21:19:07 2020 +0100

    on HitRobot we dont ram if we have low energy

commit fa8d2af9f8d7419704b6b350c812105473bab37b
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Wed Apr 22 21:28:06 2020 +0100

    robot if hit and has low energy try to escape
```

```
commit fa8d2af9f8d7419704b6b350c812105473bab37b
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Wed Apr 22 21:28:06 2020 +0100

    robot if hit and has low energy try to escape

commit 81dc035b2d22bffe99d6fdf410e84ac0ec6e0687 (origin/deborah)
Author: Deborah <deborah.rimei@student.griffith.ie>
Date:    Wed Apr 22 21:46:14 2020 +0100

    changed the movement of run()

commit d30e991eb80afc8e9cc0731dfbd0e74478e1471c
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Wed Apr 22 19:28:09 2020 -0300

    --

commit 063b1e3495c69c64e339763bb99a8bd955a3b7d9
Merge: d30e991 81dc035
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Wed Apr 22 19:30:56 2020 -0300

    new scaner version

commit 391ca41e8e946d9604c4305572fb9c3dd19f0e37
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Wed Apr 22 19:38:07 2020 -0300

    new onScannedRobot

commit c16e05204e67e43c58645aff918b6fac18232dbc (origin/anatrevis, anatrevis)
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Sun Apr 26 23:02:37 2020 -0300

    add OnHitByBullet and OnHitBullet methods to cappuccino

commit b9938172c129e0d8e4898279e0b47ffa17afe6c7 (HEAD -> master, origin/master)
Author: anatrevis <ana.trevisan@student.griffith.ie>
Date:    Mon Apr 27 16:01:46 2020 -0300

    cleanup master directory
```

- Implemented improvements to the functions and fixed remaining bugs in the code.

- **ON_SCANNED_ROBOT_METHOD** - A tracker functionality was implemented to this method. Now when Cappuccino scans a robot with less energy it becomes a target. This way Cappuccino has more chances to hit the final bullet to the enemy and get a kill bonus. It also updates the enemies energy data hashmap.

- **ON_HIT_WALL_METHOD -** Utilizes MoveTowardsCenter() method coordinate system to improve the way Cappuccino would react when hitting a corner. Previously they were Issues when he has too close to corners he would hit one of the walls and then move towards the other and hit it again.Now when he encountered a corner they 100x100 pixel buffers which get triggered and he moves towards the centre which is the most logic movement when hitting an angle especially if it's directly perpendicularly.

- **ON_HIT_ROBOT_METHOD** - Fixed the ramming method and made some changes to its behaviour.Now Cappuccino will have a few decisions to make when he is being rammed by another robot or if he happens to hit another robot.If the enemy robot has higher health our robot will now turn paralel to enemy and move straight with increased acceleration in the hope of avoiding tracking.If however the enemy robot has lower health than Cappuccino he will try to ram him and then fire with full power ignoring the ram bonus but instead trying to kill the enemy as fast as possible. It also updates the enemies energy data hashmap.

- **RUN_METHOD** - The bug caused by the duplicated declaration of the control variable tickCounter was fixed in this method.

- **AVOID_WALLS** - Buffer updated order to avoid issues with different size maps

- **MOVE_TOWARDS_CENTER -**- Continues the same as in the previous version.

- **ON_HIT_BY_BULLET_METHOD** - When Cappuccino gets hit by a bullet it tries to escape in the perpendicular direction from where the bullet came from. It also updates the enemies energy data hashmap.

- **ON_BULLET_HIT_METHOD** - By interaction with the enemy through hitting a bullet, Cappuccino stores the latest energy data of the robot in a hashmap which permits a enhanced behavior in battle based on how many enemies we have left and their energy.

Updates
(20%)

Please list the updates and bug fixes you intend to make for the next code review.

For the first review

- **Battle Results:** In the first review we noticed that cappuccino has a good survival rate but it scored poorly in the Ram section. We ended up in 1st place at battles against our classmates.

Results for 10 rounds

Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	cappuccino.Cappuccin...	3461 (45%)	1200	210	1691	235	125	0	7	1	1
2nd	sample.TrackFire	2386 (31%)	750	90	1389	156	0	0	3	2	2
3rd	sample.Fire	1620 (21%)	750	0	804	66	0	0	0	7	1
4th	sample.Target	307 (4%)	300	0	0	0	7	0	0	0	6

Results for 10 rounds

Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	cappuccino.Cappuccin...	1445 (76%)	350	70	831	89	46	59	7	3	0
2nd	anatest.AnaTest*	454 (24%)	150	30	252	18	4	0	3	7	0

Save   OK

- **Updates:**

    o   In the following updates we should add some functionality that will control the ramming of cappuccino.

    o   List the bugs that Cappuccino has for example:

        ▪   turn left was amended from - to + bearing as code did not function properly;

        ▪   used math random amended formula from min max integers to direct angle change;

        ▪   changes were made to cappuccinos if else statements as eclipse would allow compiling without brackets but robocode compiler doesn't.

For the second review

- **Battle Results:** Cappuccino 2.0 presented a good result against other robots and we were able to radically increase our ramming bonus. Cappuccinos movements are a little slow to avoid the enemies attacks. We ended up in 2nd place at battles against our classmates.

Results for 10 rounds

Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	cappuccino.Cappuccino 1.1*	4450 (32%)	2050	150	1880	231	118	22	3	5	2
2nd	sample.Walls	4359 (31%)	2350	350	1457	157	44	0	7	3	0
3rd	sample.Crazy	1701 (12%)	1150	0	459	7	85	0	0	1	4
4th	sample.VelociRobot	1677 (12%)	600	0	606	16	448	7	0	1	1
5th	anatest.AnaTest*	1278 (9%)	900	0	327	5	46	0	0	0	3
6th	sample.Target	458 (3%)	450	0	0	0	8	0	0	0	0

Save   OK

Results for 10 rounds

Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	sample.Walls	4809 (35%)	2500	500	1568	203	37	0	10	0	0
2nd	cappuccino.Cappuccino 1....	3313 (24%)	1500	0	1519	152	143	0	0	5	2
3rd	sample.VelociRobot	2564 (18%)	1150	0	865	31	499	19	0	2	3
4th	sample.Crazy	1991 (14%)	1450	0	472	6	64	0	0	2	5
5th	anatest.AnaTest*	904 (7%)	600	0	273	5	26	0	0	1	0
6th	sample.Target	313 (2%)	300	0	0	0	13	0	0	0	0

Save   OK

Results for 10 rounds

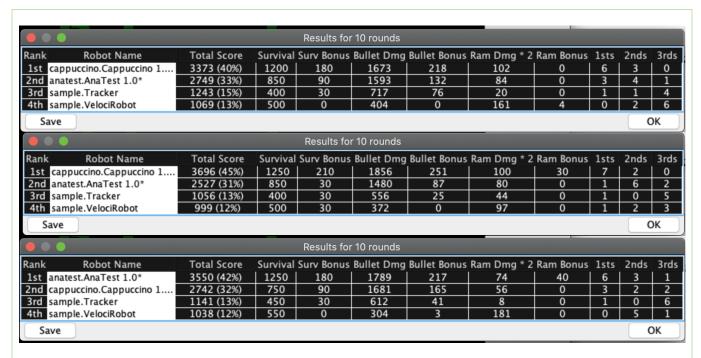| Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	sample.Walls	2995 (42%)	1450	270	1084	174	18	0	9	1	0
2nd	cappuccino.Cappuccino 1....	2146 (30%)	800	30	1082	111	102	21	1	5	3
3rd	sample.VelociRobot	1565 (22%)	600	0	619	16	330	0	0	4	4
4th	anatest.AnaTest*	388 (5%)	150	0	204	0	34	0	0	0	3

Save   OK

- **Bug Fixes:**
    - Fix the bug we have on the AvoidWalls method so Cappuccino doesn't hit the walls.
    - Add a method so the robot can hit more bullets when a bullet hits the target.
    - Modify onScannedRobot method so Cappuccino can run away if a robot has more energy or attack if they have less energy;
    - Comment the code with more detail;

- **Updates:**
    - Added an on hit robot method had to debug, the way Cappuccino responded on being hit while also the way he responds while hitting a robot.Needed to make amendments to how the Gun Turrets turns depending on how the angle changes as Cappuccino did not respond properly that depending on the situation
    - Changed the way Cappuccino responds when hitting a wall to a percentage based system rather than an 1-12 point scale.
    - Fixed a bug left a line of code left by previous debugging which flipped movement direction and caused robot to hit the wall repeatedly instead of avoiding it

For the third review

- **Battle Results:** anaTest robot contained the latest version of Cappuccino robocode, which was Cappuccino 2.0. The newest version which is Cappuccino 3.0 couldn't beat Cappuccino 2.0 at all times, but our improvements and bug fixes had offered a slightly better performance on the average of battle results.

Results for 10 rounds

Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	cappuccino.Cappuccino 1....	3373 (40%)	1200	180	1673	218	102	0	6	3	0
2nd	anatest.AnaTest 1.0*	2749 (33%)	850	90	1593	132	84	0	3	4	1
3rd	sample.Tracker	1243 (15%)	400	30	717	76	20	0	1	1	4
4th	sample.VelociRobot	1069 (13%)	500	0	404	0	161	4	0	2	6

Save · OK

Results for 10 rounds

Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	cappuccino.Cappuccino 1....	3696 (45%)	1250	210	1856	251	100	30	7	2	0
2nd	anatest.AnaTest 1.0*	2527 (31%)	850	30	1480	87	80	0	1	6	2
3rd	sample.Tracker	1056 (13%)	400	30	556	25	44	0	1	0	5
4th	sample.VelociRobot	999 (12%)	500	30	372	0	97	0	1	2	3

Save · OK

Results for 10 rounds

Rank	Robot Name	Total Score	Survival	Surv Bonus	Bullet Dmg	Bullet Bonus	Ram Dmg * 2	Ram Bonus	1sts	2nds	3rds
1st	anatest.AnaTest 1.0*	3550 (42%)	1250	180	1789	217	74	40	6	3	1
2nd	cappuccino.Cappuccino 1....	2742 (32%)	750	90	1681	165	56	0	3	2	2
3rd	sample.Tracker	1141 (13%)	450	30	612	41	8	0	1	0	6
4th	sample.VelociRobot	1038 (12%)	550	0	304	3	181	0	0	5	1

Save · OK

- **Bug Fixed:**

  - Fixed a bug left a line of code left by previous debugging which flipped movement direction and caused robot to hit the wall repeatedly instead of avoiding it

  - Fixed a bug on the run method, where a contro tickCounterl variable was declared two times

- **Updates:**

  - Updated the avoidWalls buffer method to take a fixed amount of pixels instead of a percent in order to avoid issues with different size maps

  - Updated the ram method so the robot can now engage only enemies with less health and finish them off instead of starting a duel with strong enemy robots

  - Added functionality to the onHitWall method now the robot responds better when hitting a corner using MoveTowardsCenter method

  - Created a hashmap to store the energy of all robots that Cappuccino interacted in the battlefield (via onScannedRobot, onHitRobot, onHitbyBullet and onBulletHit methods) to have the most accurate data possible of how many enemies it has left and their energy level information..

  - Added functionality to onHItByBullet method. Now Cappuccino gets the angle of the bullet that hitted him and tries to escape from the enemy in the perpendicular direction from where the bullet came from when it has more than 2 enemies in the field. This strategy is good to avoid staying in the middle of a crossed fire.

  - Added functionality to onBulletHit method so Cappuccino continues hitting bullets in its enemies and updates the new hashmap that stores latest enemies energy data.

Sharing
(10%)

Please list the students who have contributed to your Robocode (this will be compared to your 'contributors' list on Griffith GitLab)

Each group member contributed to Cappuccino development by

I.   coding their assigned methods (refer to section "Plan" to see the group division of methods),

II.   by adding extra functionality to the methods enhancing Cappuccino performance in battle,

III. by helping other group members to debug their methods codes when needed,

IV.   by equally contributing in the writing of all Milestone Reviews,

V.   by scheduling and attending to all extra class team Zoom meetings or Whatsapp calls,

VI.   and by helping each other in the learning process of how to use GitLab properly as a team.

Other tasks related to the group organisation are listed below:

- **Deborah Rimei:**

    o   Created a Trello board so Cappuccino developers could organise their tasks, assign new specific tasks for each others and meet the deadlines for the project tasks;

    o   Created a Whatsapp group to facilitate the communication within Cappuccino developers;

- **Aleksandar Mladenov:**

    o   Created the GitLab repository for Cappuccino;

Repository
(10%)

Lecturer confirms access to your Griffith GitLab repository (Y/N)

Code
(10%)

Lecturer confirms source code has been reviewed on your computer (Y/N)

Robot
(10%)

Lecture confirms download of your robot for testing from Griffith GitLab (Y/N)

Bug Reports

Bug Name: get Bearings

Bug ID: 01

Area/Path: cappuccino.java

Build Number: Cappuccino Version Number 2.0

Severity: HIGH

Priority: HIGH

Assigned to: Ana

Reported By: Alex

Reported On: 13/04/2020

Reason: Cappuccino code did not compiled.

Status: Closed.

Environment: Windows 10, Mac OS version:10.15.3 (19D76)

Description:

onBulletHit Method we tried to get the bearing of the bullet that hitted Cappuccino.

We couldn't call the getBearing method onBulletHit Method.

Expected result: Take an action to the direction of this bearing.

Proposed action/s to eliminate bug: To debug this code we eliminated the method. We will think of other solutions to the onBulletHit Method.

Bug Name: The robot hits the wall.

Bug ID: 02

Area/Path: cappuccino.java

Build Number: Cappuccino Version Number 2.0

Severity: MEDIUM (High/Medium/Low) or 1

Priority: HIGH (High/Medium/Low) or 1

Assigned to: All developers

Reported By: Deborah

Reported On: 13/04/2020

Reason: Cappuccino loses energy when it hits the wall

Status: Closed

Environment: Windows 10, Mac OS version:10.15.3 (19D76)

Description:

The robot hits the wall in battle.

Expected result: Avoid the walls when getting near them.

Proposed action/s to eliminate bug: Debugged together in a group call.

Bug Name: On Hit Robot

Bug ID: 03

Area/Path: cappuccino.java

Build Number: Cappuccino Version Number 2.0

Severity: MEDIUM

Priority: MEDIUM

Assigned to: Aleksandar

Reported By: Aleksandar

Reported On: 13/04/2020

Reason: Cappuccino was firing in the wrong direction

Status: Closed

Environment: Windows 10, Mac OS version:10.15.3 (19D76)

Description:

Initially while Cappuccino was tested with a temporary movement method for better results the targeting on hitting a robot worked perfectly. However, that was removed and the default movement was to return the gun and it didn't function properly.As a result setTurnGunRight(getHeading() - getGunHeading() + e.getBearing()); method was added to fix that

Expected result: Proper robot targeting

Proposed action/s to eliminate bug: Added a targeting method.

Bug Name: on Hit Wall direction flip

Bug ID: 04

Area/Path: cappuccino.java

Build Number: Cappuccino Version Number 3.0

Severity: MEDIUM

Priority: HIGH

Assigned to: Aleksandar

Reported By: Aleksandar

Reported On: 17/04/2020

Reason: Cappuccino keeps hitting the wall again and again.

Status: Closed

Environment: Windows 10, Mac OS version:10.15.3 (19D76)

Description: There was an old line of code which remained changing the velocity of the robot with a negative number which however also flipped the direction he would get from the bearing.After the proper direction was calculated it was flipped by 180 degrees which caused the robot to hit the walls again instead of avoiding them.Removing the line fixed the issues.

Expected result: Proper response after hitting a wall

Proposed action/s to eliminate bug: Removed a leftover line of code

Bug Name: OnBulletHit prejudices robot performance

Bug ID: 05

Area/Path: cappuccino.java

Build Number: Cappuccino Version Number 3.0

Severity: LOW

Priority: LOW

Assigned to: Ana

Reported By: Ana

Reported On: 26/04/2020

Reason: OnBulletHit method does not show positive results in battle tests.

Status: Closed

Environment: Windows 10, Mac OS version:10.15.3 (19D76)

Description: Implemented OnBulletHit method with different logic and functionalities but none showed positive results in battle tests.

Expected result: The addition of a method should contribute to our results in battle.

Proposed action/s to eliminate bug: Come with a new idea before the next battle that contributes to Cappuccino results in battle on average compared to Cappuccino latest version.

Bug Name: Tick counter variable duplicated locally at run() method

Bug ID: 06

Area/Path: cappuccino.java

Build Number: Cappuccino Version Number 3.0

Severity: HIGH

Priority: HIGH

Assigned to: Ana

Reported By: Ana

Reported On: 26/04/2020

Reason: Tick counter variable was declared two times, so the global variable is not being updated.

Status: Closed.

Environment: Windows 10, Mac OS version:10.15.3 (19D76)

Description: Tick counter variable is not being incremented.

Expected result: Tick working in the run() method.

Proposed action/s to eliminate bug: Removed the local declaration of tickCounter.