

# HLAA2021 - Final Exam – Pogamut 3

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## Assignment

Your task is to create a team of bots that is able to defend a VIP bot in Team-Deathmatch mode.

There is a brand new Java game mode created specifically for this exam that mimics the gameplay of Counter-Strike VIP game mode. Have you been playing Counter-Strike? You will be at home here in no time ☺ If not, you might want to watch this [2 minutes video](#) to get an idea.

There are two sides: Terrorists (red team) and Counter-Terrorists (blue team). One of the players from Counter-Terrorists team is designated to be VIP. Counter-Terrorists win if VIP reaches a safe area. Terrorists win either if they manage to kill the VIP or round times out (3 minutes).

VIPBot has its own fixed behavior that is outside your control (jar file provided). It just navigates to the safe area using a speed multiplier 0.6; it does not intentionally pick up any weapons on its own and fires on enemies at will (but it has skill level == 1 == total n00b).

Terrorists also have a fixed behavior that is outside your control (jar file provided again); they are just dumb DeathMatch bots, they randomly collect stuff and fire at any enemy encountered. They always fire at VIP if they can.

The game is played 5v4; 4 your bots as counter-terrorists + 1 VIP bot vs. 4 terrorists. During coding, you may decide how big opposition (how many terrorist bots) you spawn into the game. You will also be able to spawn a “braindead” terrorist into the game so you can play the game without the opposition (game mode requires at least 1 bot to be connected at both sides).

There are two maps where you can test your bots in: DM-Rankin-FE and DM-Dust2k5.

DM-Rankin-FE is a small map where you will encounter enemies fast. Not much time to arm yourself up but faster rounds will make observation of early behaviors faster. This map is advised to be used at the beginning.

Once you move to strategies that requires larger map (e.g., arming your bots up properly), it is advised to switch to DM-Dust2k5.

## Terms of exam

To obtain full 90 points, you actually do not have to save VIP always. But it would be nice ☺

Your grade will depend on how many “behaviors” you will be able to integrate and show case (commented run).

Follows the list of behaviors to implement you may choose from (text in bolds highlights functional requirements):

1. You react to enemy contact [15 points]
  - **All bots will react to contact, i.e., your bots must be communicating about spotted enemies.**
2. Guard your VIP [15 points]
  - Always have **at least one of your bots near the VIP**.
3. Coordinated fire [10 points]
  - When fighting, your **bots will concentrate** their **firepower** onto a **common target** that is **visible by majority** of your group.
4. Arm your bots from the start [10 points]

- **Two bots** will seek weapons when the round starts + they will not try to **pickup the same weapon**; they will try to return back as fast as possible when VIP gets in contact with the enemy before they get to pursued weapon.
5. Opportunistic weapon/armor/health picking [5 points]
- If guarding VIP lead any of your bot near some weapon/armor/health (1000 UT units path-distance); one of bots will go get it.
6. VIP front shield [15 points]
- You will have a bot running before the VIP when not in contact. Note that it is tricky to get in front as you do not have steering library...
7. VIP back shield [10 points]
- You will have a bot running behind the VIP when not in contact + it will be looking backwards while running.
8. VIP combat shield [10 points]
- One bot will act as a VIP shield during combat; it will try to move to the position between chosen enemy and the VIP using a Shield gun.

## Final grading:

The final score of the Pogamut 3 track is then made out of the sum of “final exam points” and “homework points”, which determines the grade.

- >= 85 points ... Grade A (“jednička”)
- <70;85) points ... Grade B (“dvojka”)
- <55;70) points ... Grade C (“trojka”)
- < 55 points ... Failure

## Exam Package

You are given an exam package that can be downloaded from here: <https://tinyurl.com/23fsz4wu>

Content (apart from this document):

CounterBot-Java

- This directory contains a project to start with. It is standard Java bot project that contains TeamComm capability + VIP bot module (`this.vip`) that provides info about the state of the game.

UT2004

- Content of this directory that needs to be copied to your UT2004 installation.

Batch files

- These batch files assume you have `java.exe` on PATH
- Respective batch files that start different things for you
  - `start-N-terrorist(s).bat` ... starts N terrorists (GB2004 dedicated server must be running)

- `start-braindead-terrorist.bat` ... starts “braindead” terrorist, it won’t do anything (GB2004 dedicated server must be running)
- `start-tdm-DM-Dust2k5.bat` ... starts a dedicated GB2004 server with TeamDeathMatch on DM-Dust2k5 map
  - In order for this batch file to work, you have to edit it and change the path to your UT2004 installation.
- `start-tdm-DM-Rankine-FE.bat` ... starts a dedicated GB2004 server with TeamDeathMatch on DM-Rankin-FE map
  - In order for this batch file to work, you have to edit it and change the path to your UT2004 installation.
- `start-team-comm.bat` ... starts TeamComm server for your bots (terrorists are not using it...)
- `start-vipbot.bat` ... starts VIP bot (GB2004 dedicated server must be running)

## VIP game info

Each bot contains a new module under a field `vip / getVIP()` within `CounterBot`. It provides information about the state of the game. Useful methods:

- `isRoundRunning()` ... whether round is currently being played
- `getVIPId()` ... returns ID of the bot that is VIP
- `getVIPSafeArea()` ... returns location VIP needs to get to

Additionally, there is `roundStart` event listener within `CounterBot` that is triggered every time a new VIP game round begins.

## VIP bot behavior

VIP is running with speed 0.6. You have two actions (`setVIPSpeed()` and `setNormalSpeed()`) to alter the speed of your bot and two senses (`isVIPSpeed()` and `isNormalSpeed()`) at hand to check what your bot is using.

VIP is typically running to the safe area, but it may not. It always broadcast its intention (what location it is running currently to) via custom TeamComm message `TCRunningTo`; there is already a field `vipRunningTo` implemented within `CounterBot`. This message is sent periodically by VIP even when the target does not change.

## TeamComm

There is usual “info sharing messaging” setup for you. This is used by VIP bot as well (you will always know its precise location). You can of course setup additional messaging as you see fit. There is a stub `CommUser` created for you to handle the communication.

## Setting VIP game mode up

At the beginning you have to do following step once:

1. Copy UT2004 into D: drive (if you are not on your own notebook)
2. Copy content of UT2004 directory from the exam package into the UT2004 installation overwriting everything.
3. Adjust `start-tdm-DM-Dust2k5.bat` and `start-tdm-DM-Rankine-FE.bat` so they get into the correct UT2004 directory.

Every time you want to switch to a different map or completely restart everything you have:

4. `start-tdm-DM-Rankine-FE.bat` or `start-tdm-DM-Dust2k5.bat`
5. `start-team-comm.bat`
6. `start-vipbot.bat`
7. `start-N-terrorist(s).bat` or `start-braindead-terrorist.bat`

To (re)start VIP game:

8. Go to your project `CounterBot-Java` and launch `StartVIP` file.
  - Inside its `main()` method you may configure how many Counter-terrorists (your bots) you want to start with that.
  - Also you need to make sure you're running the VIP for correct map; there are two methods `startVIP_DM_Rankin_FE()` and `startVIP_DM_Dust2k5()`. Un/comment them according to the map you're running.
9. To end the VIP game, just terminate this process; to restart your bots / mod, just restart `StartVIP`.

## Tricks & Pitfalls

1. Newly connected bots will not hop on onto the running VIP game round; but after the round restarts, they should catch up.
2. You cannot truly play the VIP game (it does not fully work), but it won't fail the VIP game mode, so you can be present within the environment if you wish to.
3. To get in front of the VIP bot, you might consider to dodge left or right in case your movement would be colliding with the VIP.
4. You are running a team game, `players` module will correctly report who are `Friends` and who are `Enemies`.
5. Good Luck & Have Fun! (Hopefully ... GG & no re.)
6. You may consult your code with me at any time (as if I was a senior developer, even though I might be a busy one).
7. Friendly fire is disabled.

## When you are done

1. If you decide you are done (or the submission deadline is steadily approaching), edit README.TXT within CounterBot-Java folder and document what behaviors you have been working on and what is their status. Then zip up your CounterBot-Java folder and submit it to me via, e.g. [wetransfer.com](https://wetransfer.com), to address [jakub.gemrot@gmail.com](mailto:jakub.gemrot@gmail.com)
2. The submission deadline is 30.6.2021, 17:00 CEST

## Q & A

For clarification, you can reach me:

1. at <https://whereby.com/jakub.gemrot>
2. or via Discord, my Discord name is Jakub Gemrot#7541
3. or via Skype, my Skype name is jakub.gemrot;
4. or just call me directly +420 724 508 170.

Just beware, I will be on the state final exams during morning, so my assistance between 9-12 will be limited ;-(