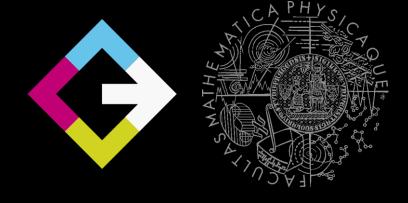
Faculty of Mathematics and Physics Charles University 15th February 2023



Human-like Artificial Agents

Lab o1.1 — Prequel

Jakub Gemrot



Labs What?



What this is going to be about ...?

Coding agent behaviors for a real-time game... actually 2 games.

Labs

What – UT2004 and Pogamut 3





Labs What - <u>NOTA</u>





Labs

What – Common Architecture



NPC component

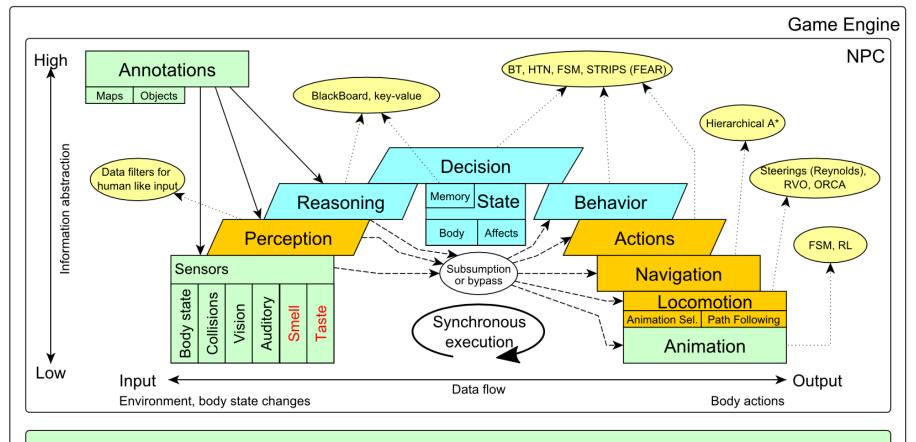
NPC Layer

Simulation

Low-level reasoning

High-level reasoning





Game mechanics, Physics, Animation, Rendering

Labs

How to pass?



How can I pass the labs?

In a nutshell – do homeworks.

Labs Passing the Labs



You have to do all homeworks (at least their base variants) from both tracks (Pogamut 3 and NOTA).

Labs Course Grading?



How about the course grading?

That depends on your exam performance + extra points you can earn from homeworks.

Labs How to pass?



See webpage for details:

https://gamedev.cuni.cz/study/courseshistory/courses-2022-2023/human-likeartificial-agents-summer-2022-23/

Scoring system

Exam -> up-to 40 points

Labs final -> up-to 90 points

Advanced points from homework -> up-to 40 points

Labs Course Exam?



Exam => Test-powered

Labs final => 2 variants of the exam

Pogamut 3 or NOTA, you choose!

The exam task is going to be like "Create a teambehavior that will do X and Y in platform Z in a given amount of time".

Advanced homework points => meet requirements of advanced tasks, which are not necessary to pass the homeworks

Labs Time?



How much time should I reserve?

A fair amount...

Labs Workload?

You are expected to be delivering homeworks on the weekly basis.

⇒ Reserve 1-4 hours per week to solve them at least

1 ETCS Credit	45 minutes (per week)
Artificial Agents	2/2 points
	6 credits
	4,5 hours
Lecture	1,5 hours
Practice	1,5 hours
Homework	2,5 hours

Labs Questions?

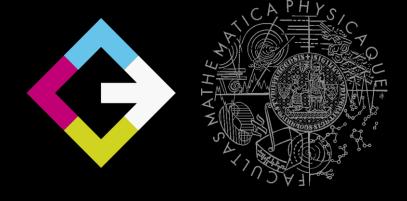


A&D

Better safe then sorry...

https://discord.gg/c49DHBJ

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UT2004 bots made easy!

Pogamut 3

Lab o1.2 – Gentle introduction



Java Warm up



Fill the short test for this lessons

https://tinyurl.com/yst43rfy

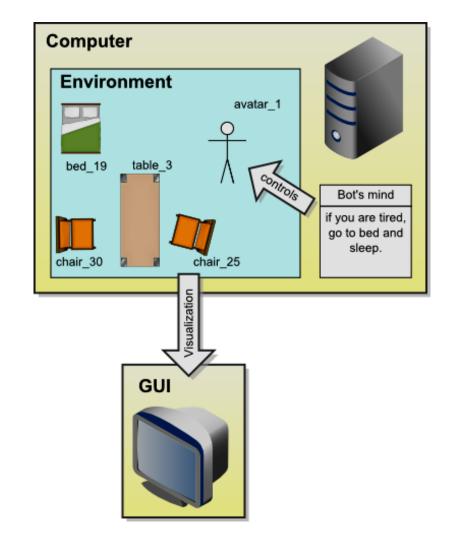
```
0 vs. 0, i vs. 1 vs. 1
```

Permanent link:

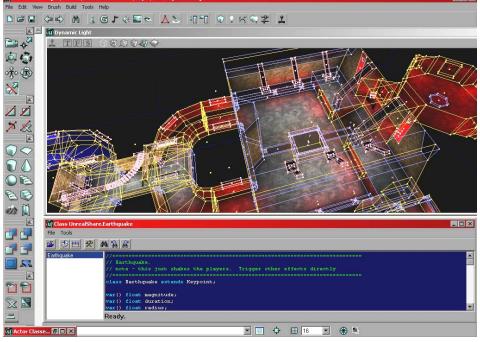
https://docs.google.com/forms/d/e/1FAIpQLSduUfFswIIX
Y3xhgnKj046ZlRVI0u-LwnQce6aoJkx-Tu6wMw/viewform

Should take about 12 minutes limit It's okey to Google ;-)

Virtual worlds

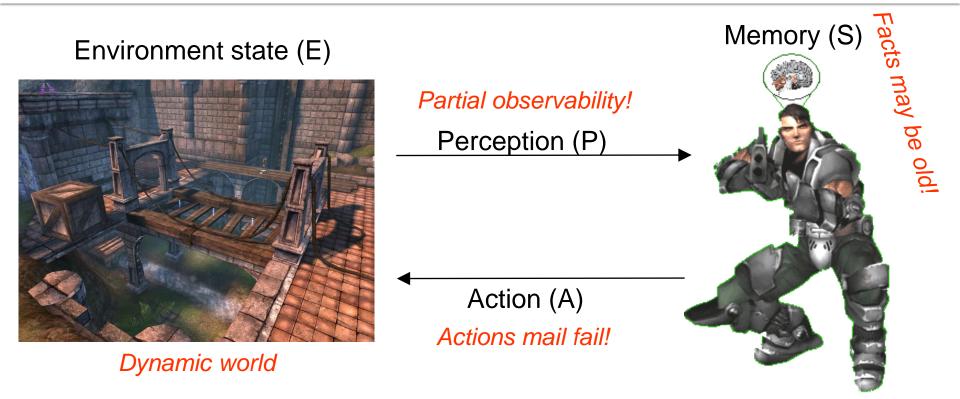






IVAs and Virtual worlds

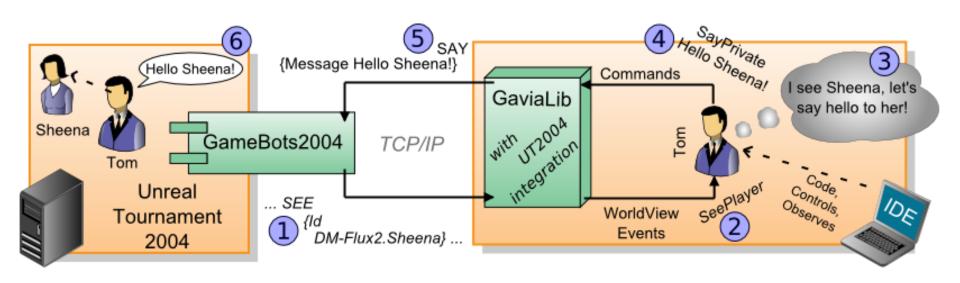




- 1. Part of environment state E is exported to the agent p(E) = P
- 2. Agent performs action-selection: f(P,S) -> AxS
- 3. Actions are carried out in the environment: $s(A^n,E) \rightarrow E$

Pogamut 3 platform UT2004 and IVAs





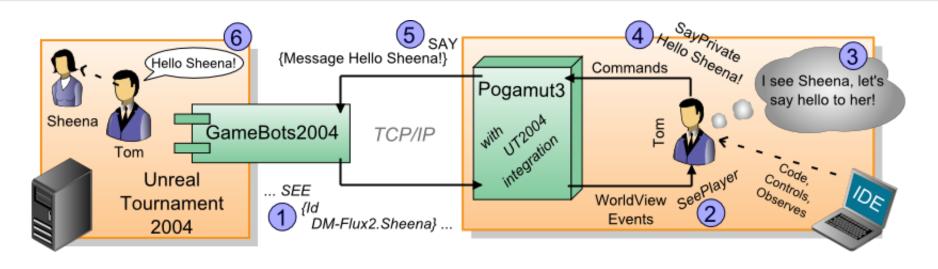
UT2004 is our v-environment simulator and thus it is implementing function s.

GameBots2004 implements partial observability function **p** and mediates decisions to UT2004.

You have to supply action-selection function **f** and possibly extra memory states **S**.

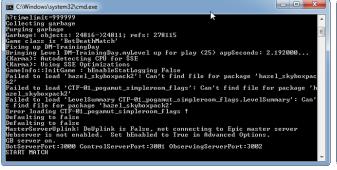
Pogamut 3 platform UT2004 and IVAs

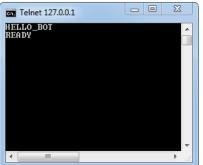


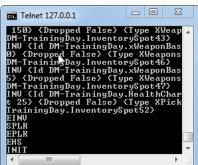


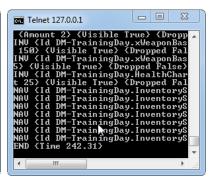
Let's *TELNET*-operate the bot!

UT2004/System/ucc.exe server DM-TrainingDay?game=GameBots2004.BotDeathMatch telnet 127.0.0.1 3000 ... or you can use Putty and its Telnet mode











How to get Pogamut bots up and running?



[A] Install UT2004

You can borrow a copy with me. Just drop me an EMAIL!

[B] You need to patch it with "latest" 3369 version

Download it from <u>here</u>

[C] Then you need to overlay your installation with GameBots2004 mod

Details on the next slide...

[**D**] You need at least Java 1.8+, it MUST be JDK! Just install the latest if unsure from here

[E] You will need IDE, choose whatever you want but it must support Maven projects, e.g. <u>Eclipse</u>, <u>Idea</u>

[F] The rest of steps will be covered by Maven automatically (Pogamut is using Maven as a build and packaging tool), which is included within mentioned IDEs

Installation of Pogamut Step [C]: GameBots2004



[C] Installing GameBots2004 mod

- Download the link above; it contains zipped
 UT2004 folder
- Contents of zipped UT2004 folder should be copied into the directory of your UT2004 installation
 - Do not forget that UT2004 must not be running during this patching!



[G] In order to run the environment, you have to start UT2004 dedicated server

Just locate startDMServer.bat file within
 UT2004 directory (might be in the System folder)
 and run it

for package 'hazel skyboxpack2'

an't find file for package 'hazel_skyboxpack2'

oom flags.LevelSummary': Can't find file for package 'hazel skyboxpac

```
Garbage: objects: 24816->24811; refs: 278115
Game class is 'BotDeathMatch'
Fixing up DM-TrainingDay
Bringing Level DM-TrainingDay.myLevel up for play (25) appSeconds: 2.112000...
(Karma): Autodetecting CPU for SSE
```

You should see

BotServerPort:3000 START MATCH

At the end of the dedicated server console.

```
MasterServerUplink: De, not connecting to Epic master server Webserver is not ena GB server on.
BotServerPort:3000 ControlServerPort:3001 ObservingServerPort:3002
START MATCH
```



[H] In order to run game and connect it to the dedicated server, you have to start UT2004

• Just locate startUT2004.bat or startUT2004low.bat file and run it





[I] The rest is about downloading a project template, import it as Maven project into IDE of your choice, run it

First (Empty) Bot Hands on time!



- Let's look into the basics of Pogamut API...
- Project stub
 - https://drive.google.com/file/d/1QLp_G5kv3Aaxz9h_x-X6caulRWE5Hfv/view?usp=sharing
 - If you have UT2004 with GB2004 mod up and running, download it now!
- Import E00-EmptyBot as a Maven project into Eclipse
 - Eclipse -> Menu -> File -> Import Project -> Maven -> Existing Maven Projects

SHOW TIME!



The First Pogamut / UT2004 Bot

It's going to be easier than you think...

https://drive.google.com/file/d/1QLp_G5kv3A-axz9h_x-X6cauIRWE5Hfv/view?usp=sharing

Has only BASE variant



- Download homework project
 - https://drive.google.com/file/d/1u9qcyFc_J y1T2d3_N6Qh1QszIGmRQag6/view?usp=s haring
 - There are two bots in the project:
 - SearchBot, which you should implement
 - CheckerBot, which you will implement
 SearchBot behavior against

Has only BASE variant



- Check SearchBot class javadoc, it contains the assignment
- In a nutshell, you run CheckerBot, implement beheavior of SearchBot, run SearchBot and if it is correct, the CheckerBot terminates itself with exception "CONGRATULATIONS!" ☺
- Warning, CheckerBot works correctly with DMlon1-Albatross map only! Edit startGamebotsDMServer.bat and change the name of started map there.

Homework 01 CheatSheet

This makes sense only if you have read SearchBot javadoc



- Module this.info holds information about your bot
 - .getDistance(Player) should be useful in this homework
- Module this.players holds information about other players in the game
 - canSeePlayers() and
 - getNearestVisiblePlayer() are interesting in particular
- Module this.navigation allows you to navigate around

 - .navigate(Player)
 - .stopNavigation()

CheatSheat



- Module this.shoot provides basic shooting
 - .shoot(Player)
 - .stopShooting()
- Oh, and make sure your bot has very weak gun in hands while you try to poke the CheckerBot
 - this.weaponry.changeWeapon (UT2004ItemType.ASSAULT_RIFLE)
- Listen to GlobalChat event to receive text messages
- Listen to PlayerDamaged event to know that you hit the CheckerBot

CheatSheat



- You will the most likely want to create simple finite-state machine (e.g., via switch statement over integer state variable) to simulate sequence of "sub-behaviors" you want to go through
 - Find player -> Say hello -> Wait response -> ...
 - And restart FSM if the CheckerBot abruptly disappears... i.e., fall back to "Find player" subbehavior
 - Oh, and do not start shooting right away after you say "You are not a friend."

Submissions



Submissions will always happen through GDrive.

Once you finish your homework, ZIP UP your project folder COMPLETELY (except the target folder) and upload the ZIP file into the shared GDrive folder.

I can share this folder with you only if you filled the Jaba questionnaire ;-)