



OPERAČNÍ PROGRAM PRAHA
ADAPTABILITA



EVROPSKÝ SOCIÁLNÍ FOND

Pogamut 3

Lekce 5 – CTF a POSH Bot

PRAHA & EU
INVESTUJEME DO VAŠÍ BUDOUCNOSTI

Faculty of mathematics and physics
Charles University at Prague
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UT2004 & UE2 bots made easy!

Pogamut 3

Lecture 5 – CTF POSH Bot



Warm up!

Fill the test for this lecture!

Home work: Hunter Bot

Let's review home works from previous lectures!

How to handle weapons:

```
weaponPrefs
```

```
shoot.shoot(weaponPrefs, enemy)
```

Today's menu

1. CTF
 - CTF rules & `ctf` module
 - Use 3.3.1-SNAPSHOT !
2. Behavior Oriented Design (BOD)
3. Simple CTF bot implementation

CTF



- 2 teams, 2 bases, 2 flags (RED vs BLUE)
- You can score by capturing (walking over) enemy flag and get with it to your base
- You cannot score if your-team flag is stolen
- Only points for capturing the flag are counting (killing somebody is just a mean for defending your flag)

CTF



- `AgentInfo.TEAM_BLUE`
- `AgentInfo.TEAM_RED`
- `ctf.getOurBase()`
- `ctf.getEnemyBase()`
- `ctf.isBotCarryingEnemyFlag()`
- `ctf.canBotScore()`
- `ctf.isOurFlagHome()`

- `etc...`

```
new UT2004BotRunner
    <UT2004Bot, UT2004BotParameters>
        (MyBot.class, "CTFBot").setMain(true)
.startAgents (
    new UT2004BotParameters().setTeam(AgentInfo.TEAM_BLUE),
    new UT2004BotParameters().setTeam(AgentInfo.TEAM_RED)
);
```

CTF



- Use version 3.3.1-SNAPSHOT !!!
- Be sure to start CTF version of GameBots2004 !
 - `startGamebotsCTFServer.bat`
- Let's QUICKLY create a POSH bot that runs to enemy base and back ... nothing else

Today's menu

1. CTF
 - CTF rules & `ctf` module
 - Use 3.3.1-SNAPSHOT !
2. **Behavior Oriented Design (BOD)**
3. Simple CTF bot implementation

How to design bots?

- Ok, we have CTF rules, looks more complex than ordinary death-match
- How to design CTF bot behavior?
- Is there some guidelines for creating behaviors in general?

⇒ **Behavior oriented design!**

<http://www.cs.bath.ac.uk/~jjb/web/bod.html>

1. Initial Decomposition
2. Revising BOD Specifications
3. Iterative Development

Initial decomposition

<http://www.cs.bath.ac.uk/~jjb/web/BOD/AgeSo2/node7.html>

1. Specify at a high level what the agent is intended to do.
 - get weapons&armor, capture enemy flag, defend own flag, seek for stolen flag, ...
2. Describe likely activities in terms of sequences of actions.
 - find suitable weapon, find enemy base, get to enemy base, find flag, ...
3. Identify an initial list of sensory and action primitives from the previous list of actions.
4. Identify the state necessary to enable the described primitives and drives.
5. Identify and prioritize goals or drives that the agent may need to attend to. This describes the initial roots for the reactive plan hierarchy.
6. Start implementing first primitives & behaviors.

Initial decomposition

You can see it as specifying a table!

Environment state (E)



Perception (P)



Memory (S)



Action (A)



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

Initial decomposition

You can see it as specifying a n-dim table of responses!

Environment state (E)



Perception (P)



Memory (S)



Action (A)



2. Agent performs action-selection: $f(P,S) \rightarrow AxS$

$P = \{\text{my-flag-home/stolen/dropped, enemy-flag-home/stolen/dropped, ...}\}$

$S = \{\text{want-to-have-weapon, want-to-steal-flag, want-to-find-my-flag}\}$

Assignment 5

30 / 100 points

- Implement simple CTF-Bot in POSH
 1. Try to have decent weapon
 2. Try to steal enemy flag
 3. If your flag is stolen, try to find it and recapture it

Assignment 5

Cheat sheet

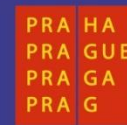
```
if (ctx.getCtf().getOurFlag().isVisible() &&
    ctx.getCtf().isOurFlagHeld()) {
    Player holder =
        ctx.getPlayers().getPlayer(ctx.getCtf().getOurF
    lag().getHolder());
}
```

Send your assignment to

- Completely zip-up your project(s) folder
- Send it to:
 - Jakub Gemrot (Friday practice lessons)
 - jakub.gemrot@gmail.com
 - Michal Bída (Wednesday practice lessons)
 - michal.bida@gmail.com
- Write us how much time you have spent on setting up the Pogamut platform and the assignment respectively!



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DĚKUJI ZA POZORNOST



Evropský sociální fond
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