Faculty of mathematics and physics
Charles University at Prague
4th March 2011

UT2004 bots made easy!

Pogamut 3

Lecture 1 – Gentle introduction

Virtual worlds

familiar

Simplified reality

gravity

solid walls

simulated

communication

real-time!

Virtual humans

needs

goals

motivations

rules

emotions

communication

real-time!

Our scope – UT2004

needs

goals

motivations

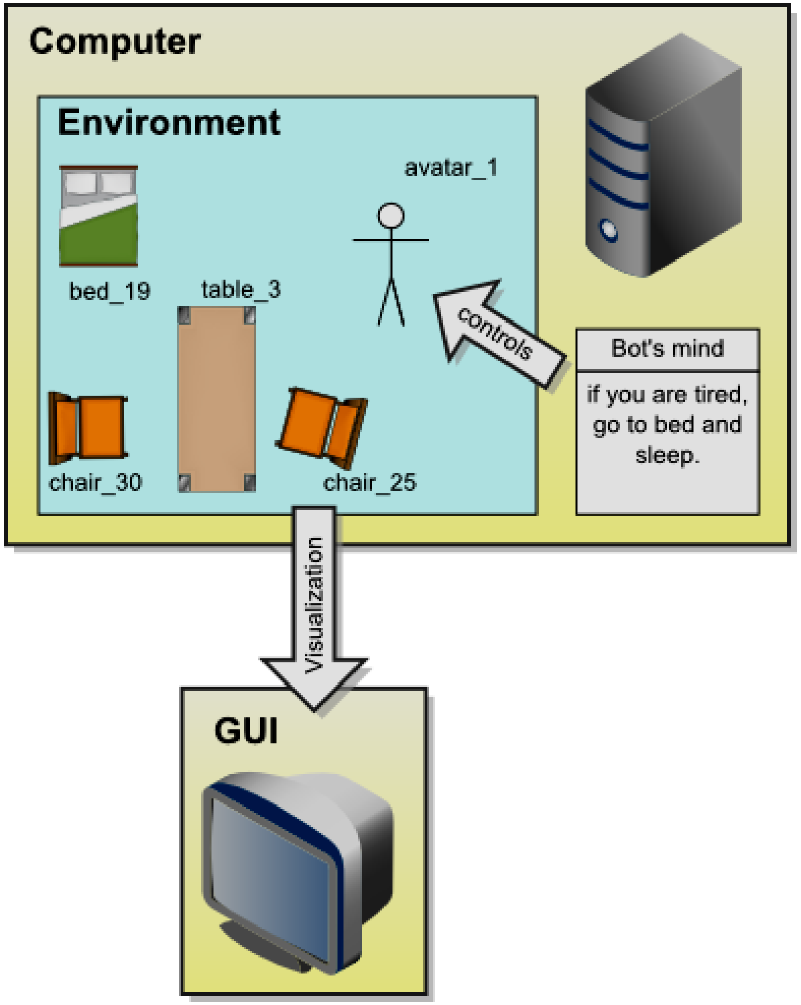
rules

emotions

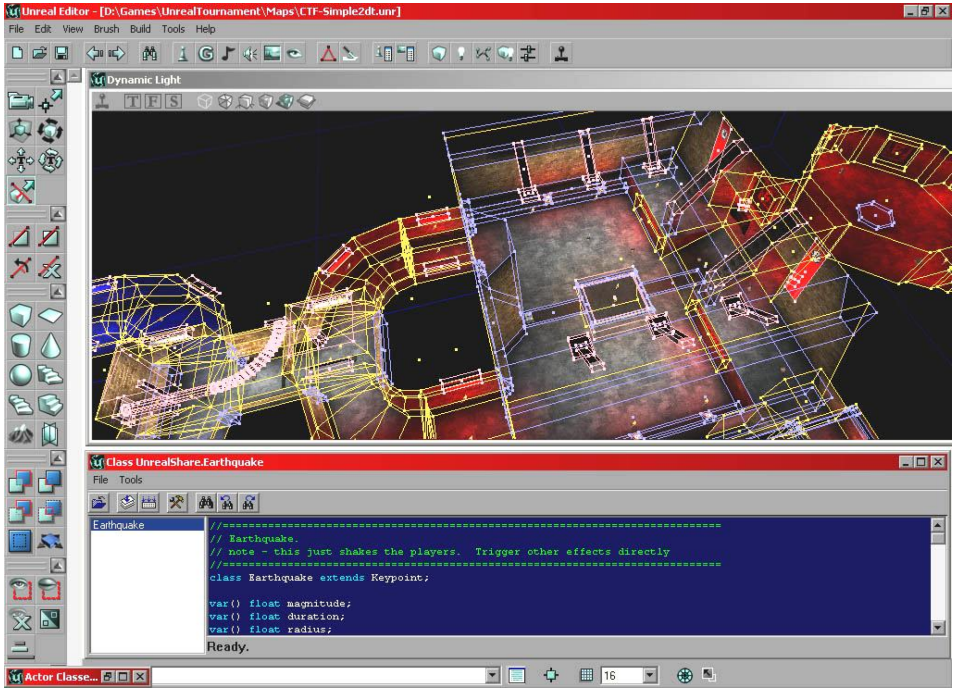
communication

real-time!

Virtual worlds



if you are tired, go to bed and sleep.

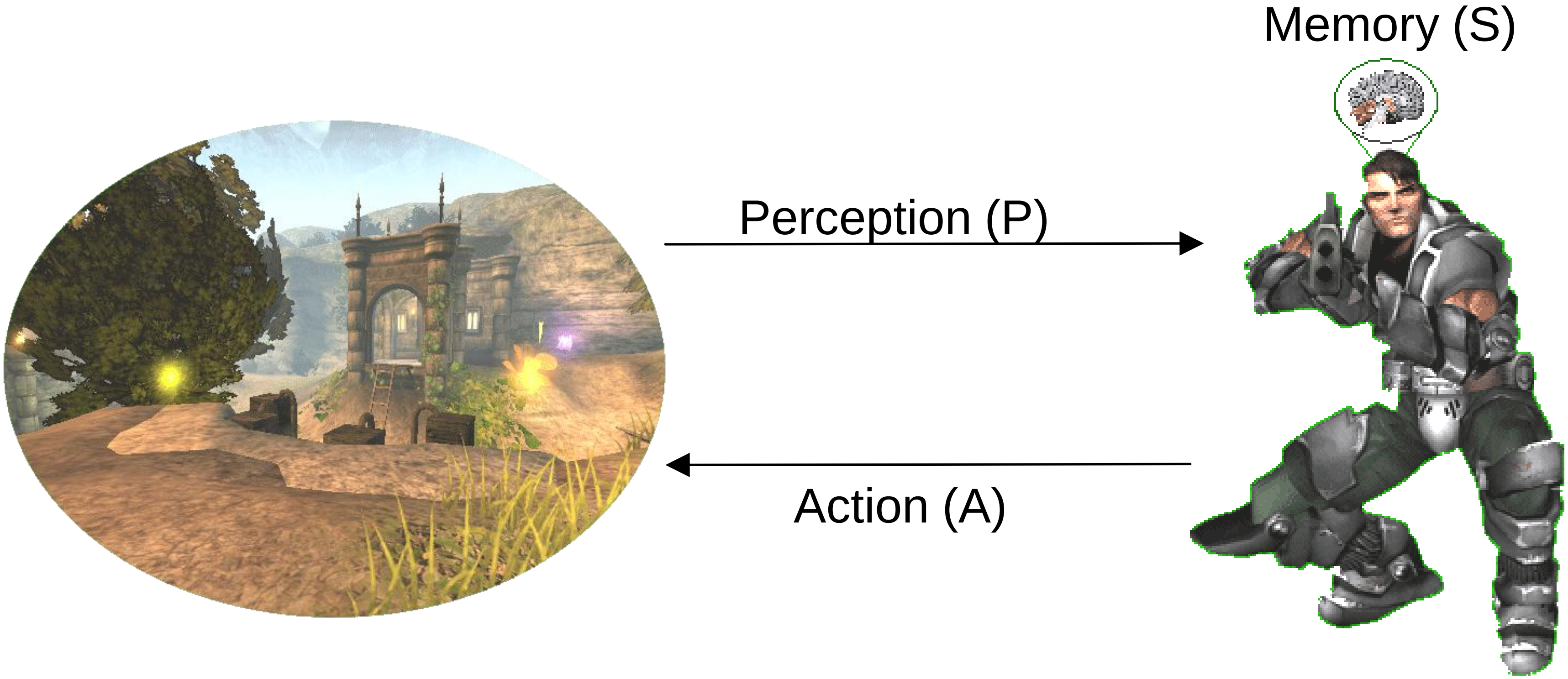

Unreal Editor - [D:\Games\UnrealTournament\Maps\CTF-Simple2dt.unr]
File Edit View Brush Build Tools Help
Dynamic Light
Class UnrealShare.Earthquake
File Tools
Earthquake
Actor Classe...
16

```
//=============================================================================
// Earthquake.
// note - this just shakes the players.  Trigger other effects directly
//=============================================================================
class Earthquake extends Keypoint;

var() float magnitude;
var() float duration;
var() float radius;
```

Ready.

Agents and virtual worlds

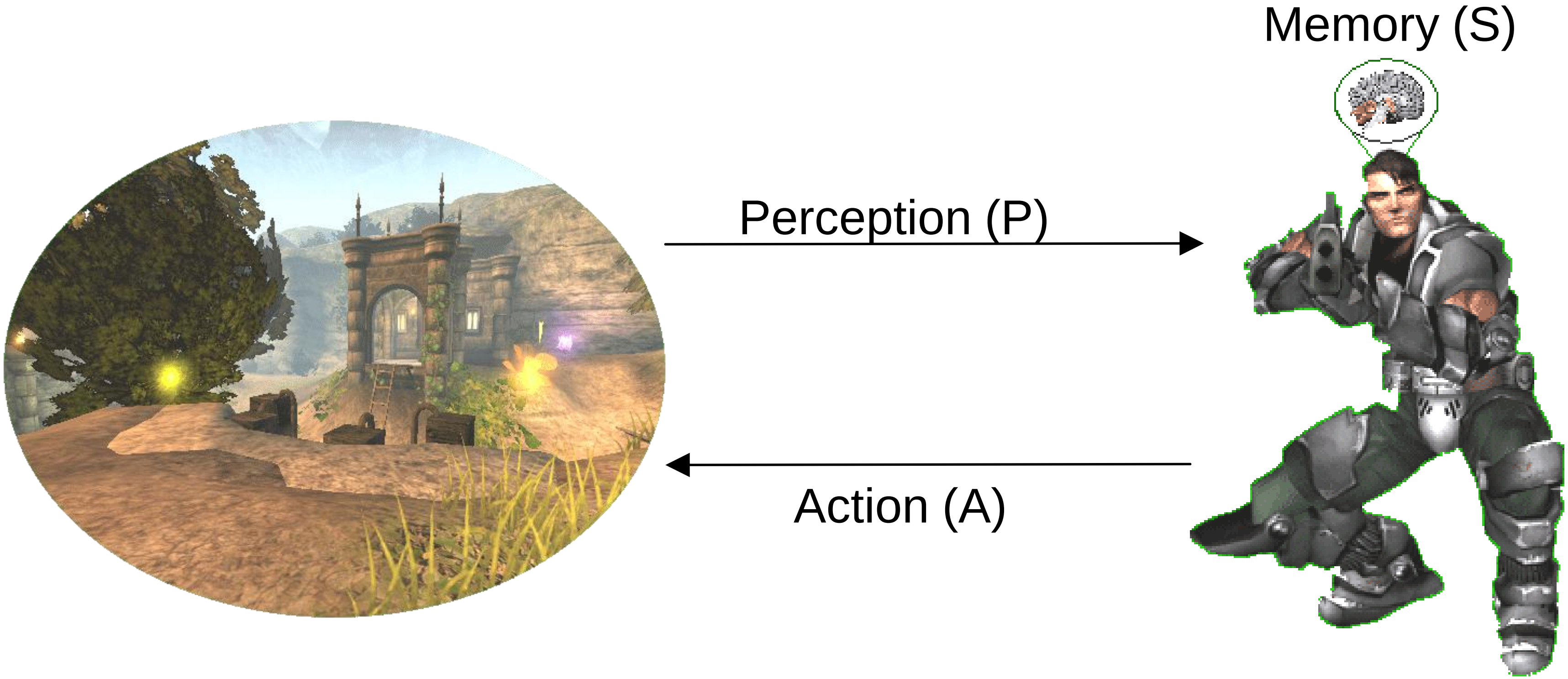


Memory (S)

Perception (P)

Action (A)

Agents and virtual worlds



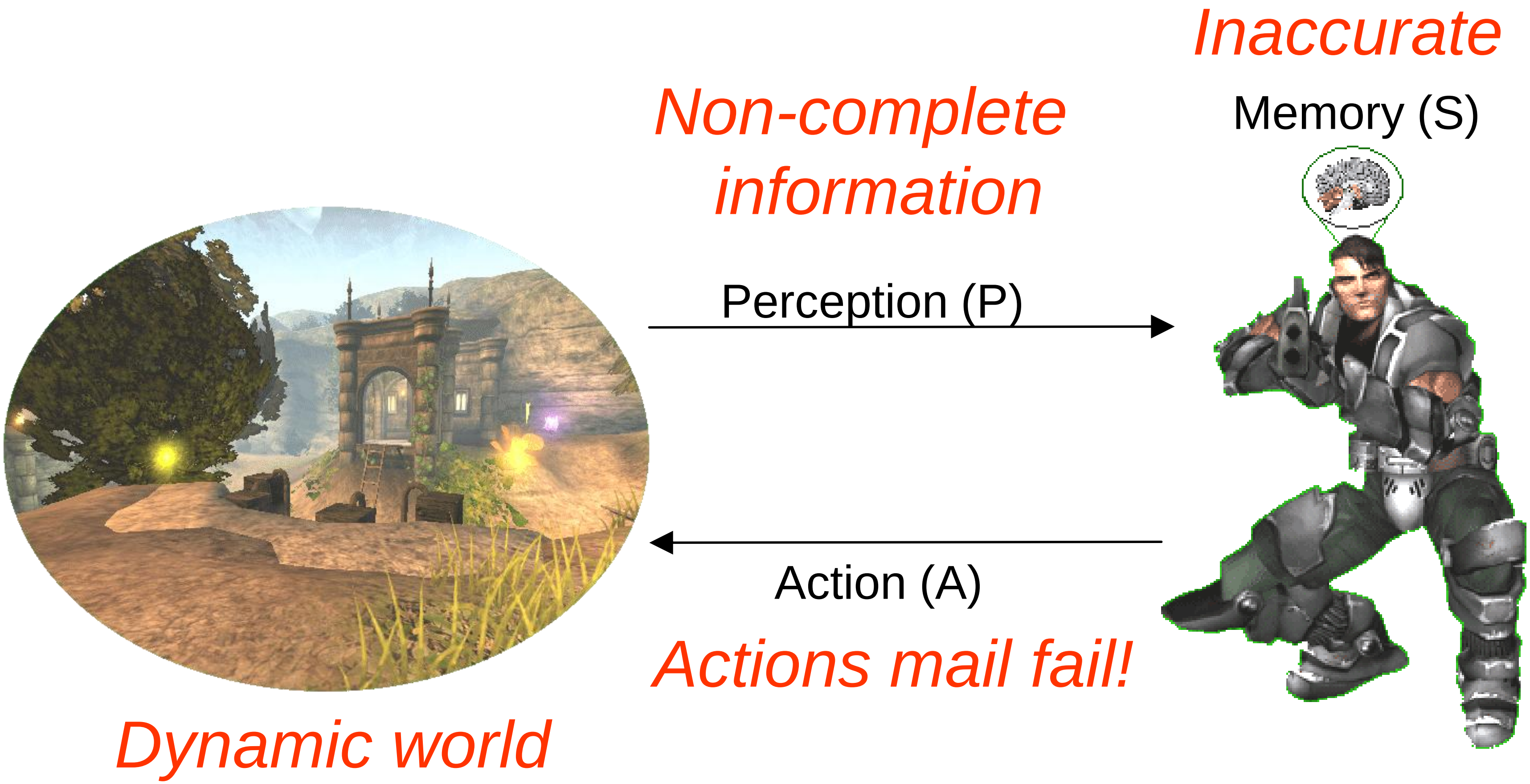
Memory (S)

Perception (P)

Action (A)

Agent’s action selection is a function: f(P,S) -> AxS

Agents and virtual worlds



Inaccurate

Memory (S)

Non-complete information

Perception (P)

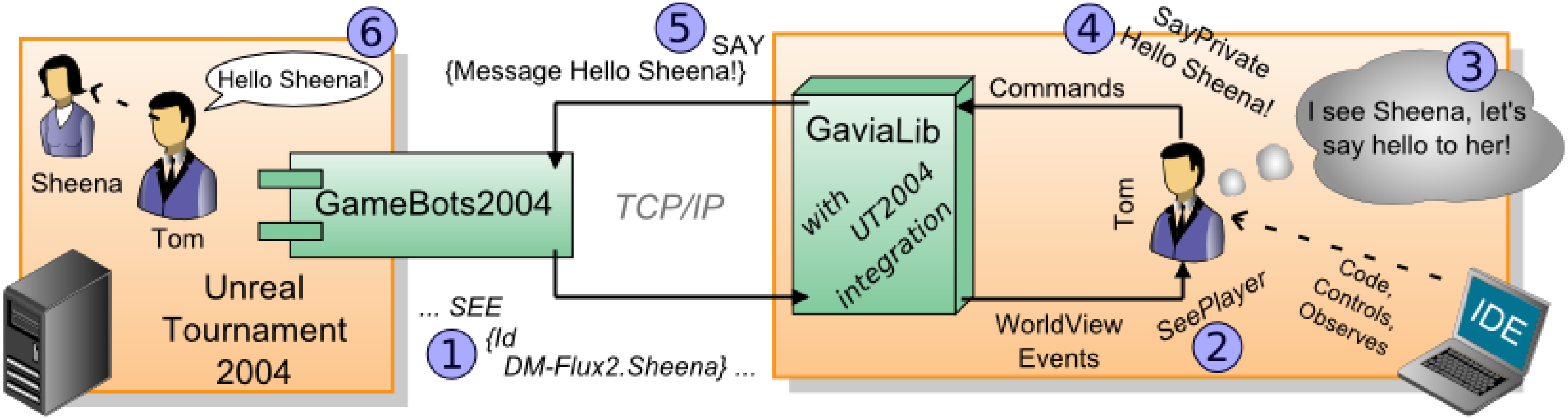
Action (A)

Actions mail fail!

Dynamic world

Agent’s action selection is a function: f(P,S) -> AxS

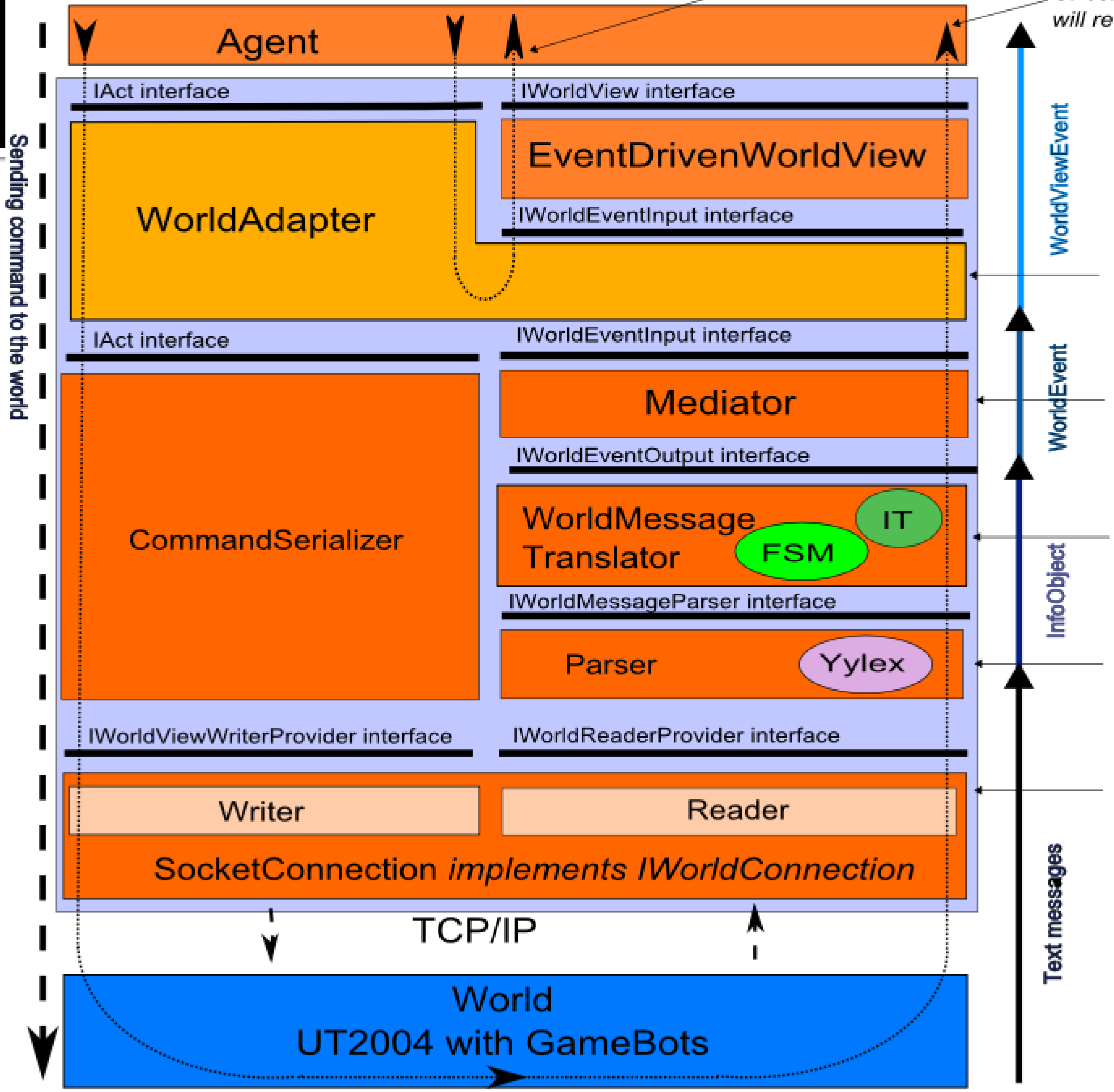
Pogamut 3’s agent



GaviaLib architecture

Commands may be catched by the WA and their effects can be simulated by producing appropriate WorldViewEvents.

Or commands are propagated through CS to the world that will respond with appropriate messages.


Agent
IAct interface
IWorldView interface
EventDrivenWorldView
WorldAdapter
IWorldEventInput interface
IAct interface
IWorldEventInput interface
Mediator
IWorldEventOutput interface
CommandSerializer
WorldMessage Translator
IT
FSM
IWorldMessageParser interface
Parser
Yylex
IWorldViewWriterProvider interface
IWorldReaderProvider interface
Writer
Reader
SocketConnection *implements IWorldConnection*
TCP/IP
World
UT2004 with GameBots
Sending command to the world
WorldViewEvent
WorldEvent
InfoObject
Text messages

Implementation of world view that is updated by events. Updates objects by events.

WorldAdapter implements mechanisms that are not supported by the real world.

Wrapps the communication thread. Once started it takes messages from the translator and gives them to the WorldView.

Handles the GB protocol. It can also agregate more messages into one or more (n:m mapping).

Translates the text messages into Java wrapper objects (InfoObjects).

Reader and writer container.

Legend:

- Gavial library
- PogamutBase class
- Pogamut optional classes
- Yylex parser generated from the XML definition of the GB2004 protocol
- FSM based message handler
- Item translator
- ◄- - - - Data flow

Pogamut web

Main web

- http://pogamut.cuni.cz/

JavaDoc (IMPORTANT!)

- http://pogamut.cuni.cz/pogamut_files/latest/doc/javadoc/

Lecture web

- http://diana.ms.mff.cuni.cz/pogamut-devel/doku.php?id=lectures

Tutorials

- http://pogamut.cuni.cz/pogamut_files/latest/doc/tutorials/

Installation of Pogamut

Step 1: Install SVN

- Install Subversion (SVN) console client
  - http://sourceforge.net/projects/win32svn/
- Set $PATH to point to the '*bin*' directory of the Subversion installation
  - E.g. C:\Program files\Subversion\bin
- Install graphical SVN client
  - http://tortoisesvn.tigris.org/

Installation of Pogamut

Step 2: Install Maven

- Pogamut has been “Mavenized”
- Download Maven 3.0.2:

  http://archive.apache.org/dist/maven/binaries/
- Unpack to *d:\maven* (or whatever…)
- Set $PATH to ‘*bin*’ directory of the Maven installation
  - E.g. C:\Program files\apache-maven-3.0.2\bin
- Set $MAVEN_OPTS=-Xmx1g –Xms512m

Installation of Pogamut

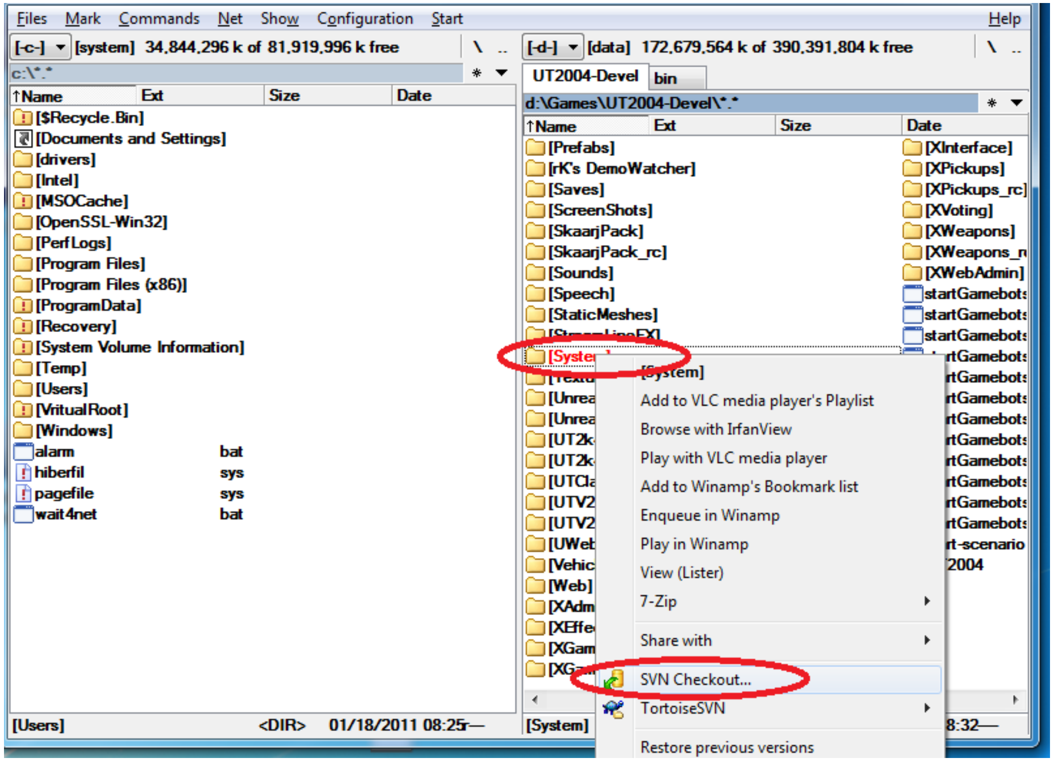
Step 3: Install and path UT2004

- Install UT2004
- Patch it with 3369 version
  - http://www.beyondunreal.com/main/ut2004/ut2004essential.php

Installation of Pogamut

Step 3: Install GameBots2004 into UT2004

- Go to UT2004, right-click System folder, choose 'SVN Checkout'



Files
Mark
Commands
Net
Show
Configuration
Start
Help
[-c-]
[system] 34,844,296 k of 81,919,996 k free
c:\*.*
[-d-]
[data] 172,679,564 k of 390,391,804 k free
UT2004-Devel
bin
d:\Games\UT2004-Devel\*.*
[System]
Add to VLC media player's Playlist
Browse with IrfanView
Play with VLC media player
Add to Winamp's Bookmark list
Enqueue in Winamp
Play in Winamp
View (Lister)
7-Zip
Share with
SVN Checkout...
TortoiseSVN
Restore previous versions

↑Name	Ext	Size	Date
[$Recycle.Bin]			
[Documents and Settings]			
[drivers]			
[Intel]			
[MSOCache]			
[OpenSSL-Win32]			
[PerfLogs]			
[Program Files]			
[Program Files (x86)]			
[ProgramData]			
[Recovery]			
[System Volume Information]			
[Temp]			
[Users]			
[VritualRoot]			
[Windows]			
alarm	bat		
hiberfil	sys		
pagefile	sys		
wait4net	bat		

[Users] <DIR> 01/18/2011 08:25—

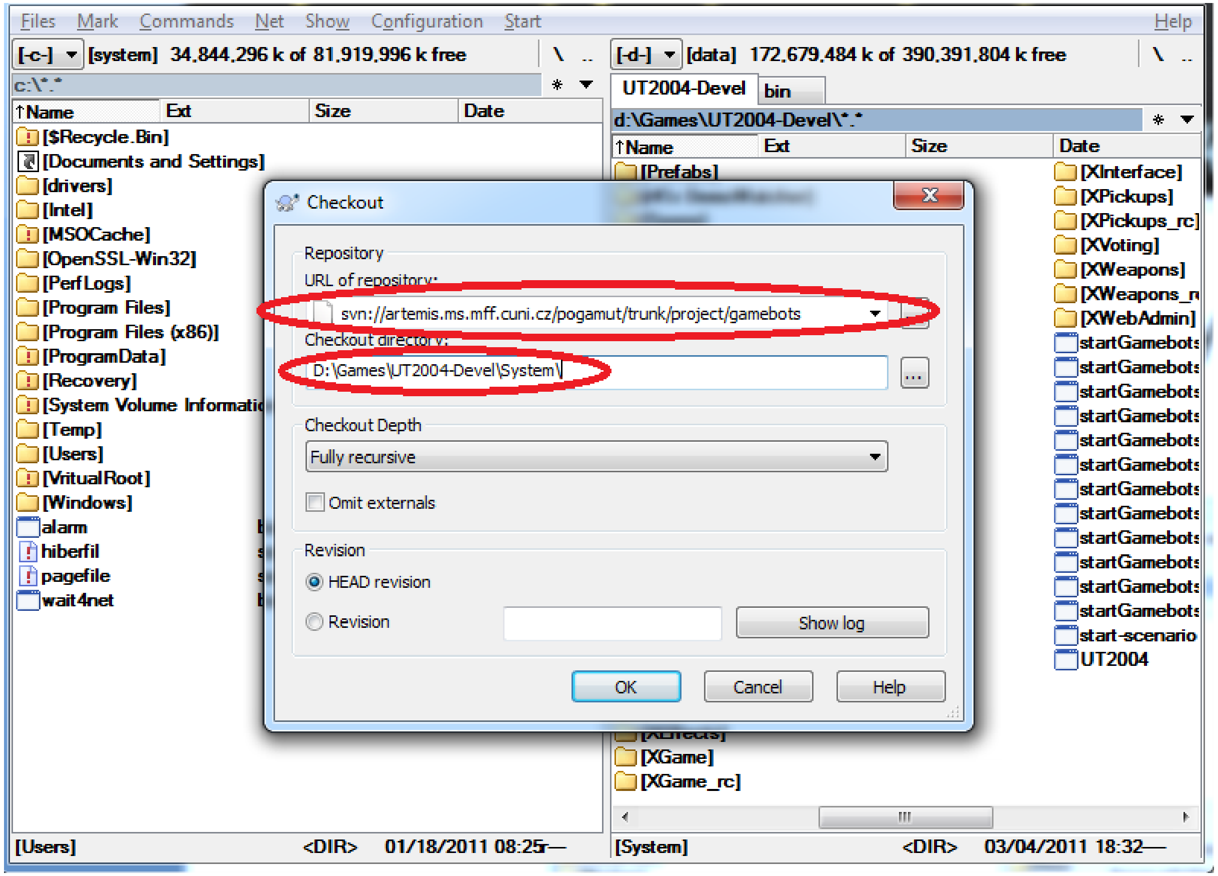
↑Name	Ext	Size	Date
[Prefabs]			[XInterface]
[rK's DemoWatcher]			[XPickups]
[Saves]			[XPickups_rc]
[ScreenShots]			[XVoting]
[SkaarjPack]			[XWeapons]
[SkaarjPack_rc]			[XWeapons_r
[Sounds]			[XWebAdmin]
[Speech]			startGamebot:
[StaticMeshes]			startGamebot:
[StreamLineFX]			startGamebot:
[Syster			rtGamebot:
[Textu			rtGamebot:
[Unrea			rtGamebot:
[Unrea			rtGamebot:
[UT2k			rtGamebot:
[UT2k			rtGamebot:
[UTCla			rtGamebot:
[UTV2			rtGamebot:
[UTV2			rtGamebot:
[UWeb			rt-scenario
[Vehic			2004
[Web]			
[XAdm			
[XEffe			
[XGam			
[XG			

[System] 8:32—

Installation of Pogamut

Step 3: Install GameBots2004 into UT2004

- Type correct address / directory and click OK.



[-c-] [system] 34,844,296 k of 81,919,996 k free

c:\*.*

↑Name	Ext	Size	Date
[$Recycle.Bin]			
[Documents and Settings]			
[drivers]			
[Intel]			
[MSOCache]			
[OpenSSL-Win32]			
[PerfLogs]			
[Program Files]			
[Program Files (x86)]			
[ProgramData]			
[Recovery]			
[System Volume Informati			
[Temp]			
[Users]			
[VritualRoot]			
[Windows]			
alarm			
hiberfil			
pagefile			
wait4net			

[Users] <DIR> 01/18/2011 08:25—

[-d-] [data] 172,679,484 k of 390,391,804 k free

UT2004-Devel | bin

d:\Games\UT2004-Devel\*.*

↑Name	Ext	Size	Date
[Prefabs]			
[XEffects]			
[XGame]			
[XGame_rc]			

[XInterface]
[XPickups]
[XPickups_rc]
[XVoting]
[XWeapons]
[XWeapons_r
[XWebAdmin]
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
startGamebots
start-scenario
UT2004

[System] <DIR> 03/04/2011 18:32—

Checkout

Repository

URL of repository: svn://artemis.ms.mff.cuni.cz/pogamut/trunk/project/gamebots

Checkout directory: D:\Games\UT2004-Devel\System\

Checkout Depth: Fully recursive

□ Omit externals

Revision

● HEAD revision

○ Revision

Start UT2004+GB2004 server

Step 4: Start GB2004 and UT2004

- Start: UT2004/System/startGamebotsDMServer.bat
  - Will launch UT2004 dedicated server with GameBots2004
- Start: UT2004/System/startUT2004low.bat
  - Will launch UT2004 GUI and connect to dedicated server

Import bot project

Step 5: Configure NetBeans

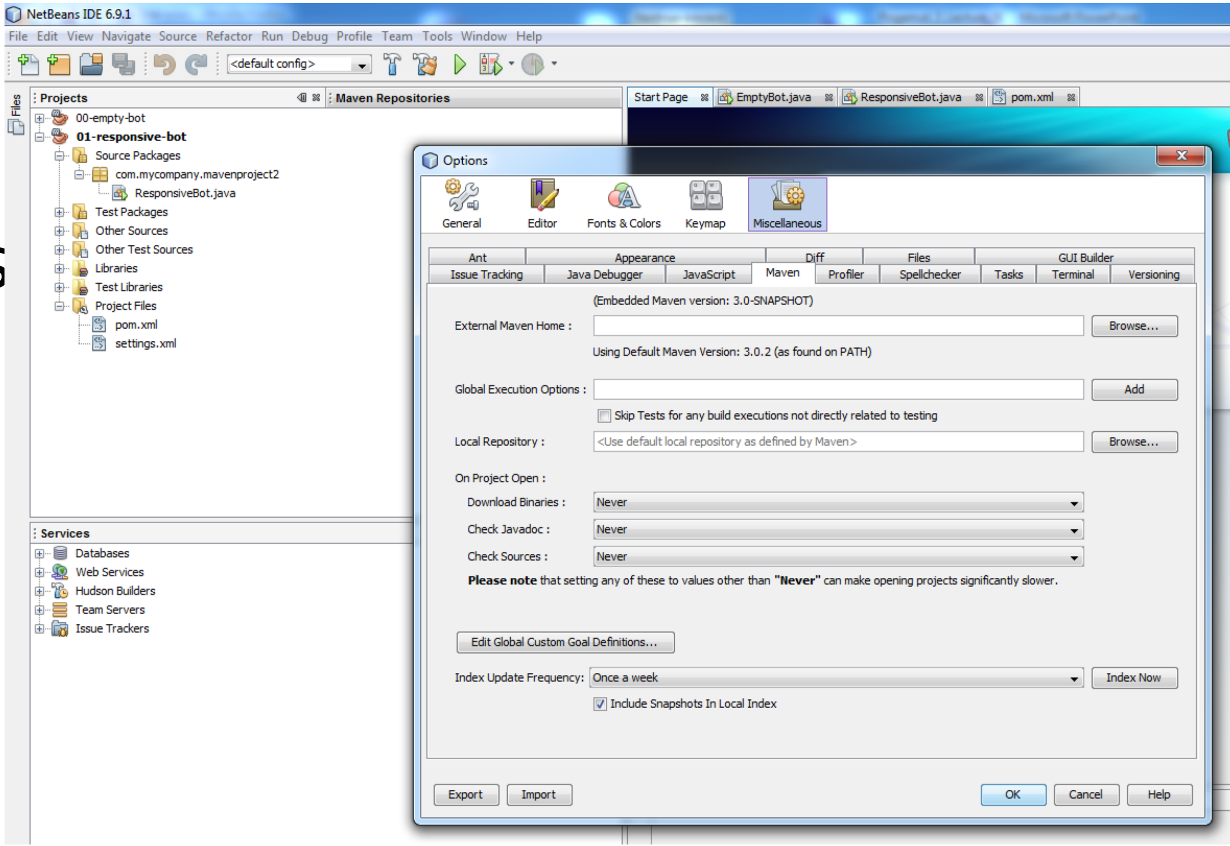
- Fire up NetBeans (preferable 6.9.1)
- Configure Maven installation

-> Menu->Tools

->Options

->Miscellaneous

-> Maven



(Embedded Maven version: 3.0-SNAPSHOT)

External Maven Home :

Using Default Maven Version: 3.0.2 (as found on PATH)

Global Execution Options :

☐ Skip Tests for any build executions not directly related to testing

Local Repository : <Use default local repository as defined by Maven>

On Project Open :

Download Binaries : Never

Check Javadoc : Never

Check Sources : Never

Please note that setting any of these to values other than **"Never"** can make opening projects significantly slower.

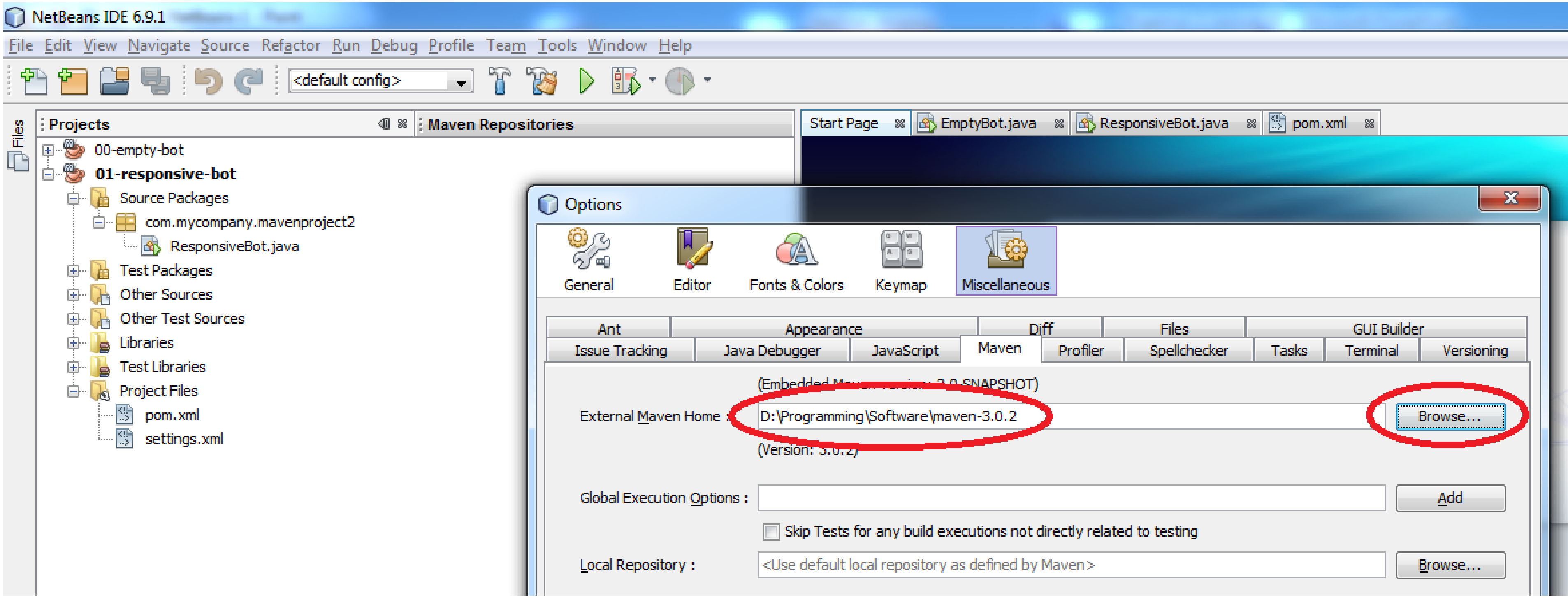
Index Update Frequency: Once a week

☑ Include Snapshots In Local Index

Import bot project

Step 5: Configure NetBeans

- Enter correct External Maven Home



(Embedded Maven Version: 3.0-SNAPSHOT)

External Maven Home : D:\Programming\Software\maven-3.0.2

(Version: 3.0.2)

Global Execution Options :

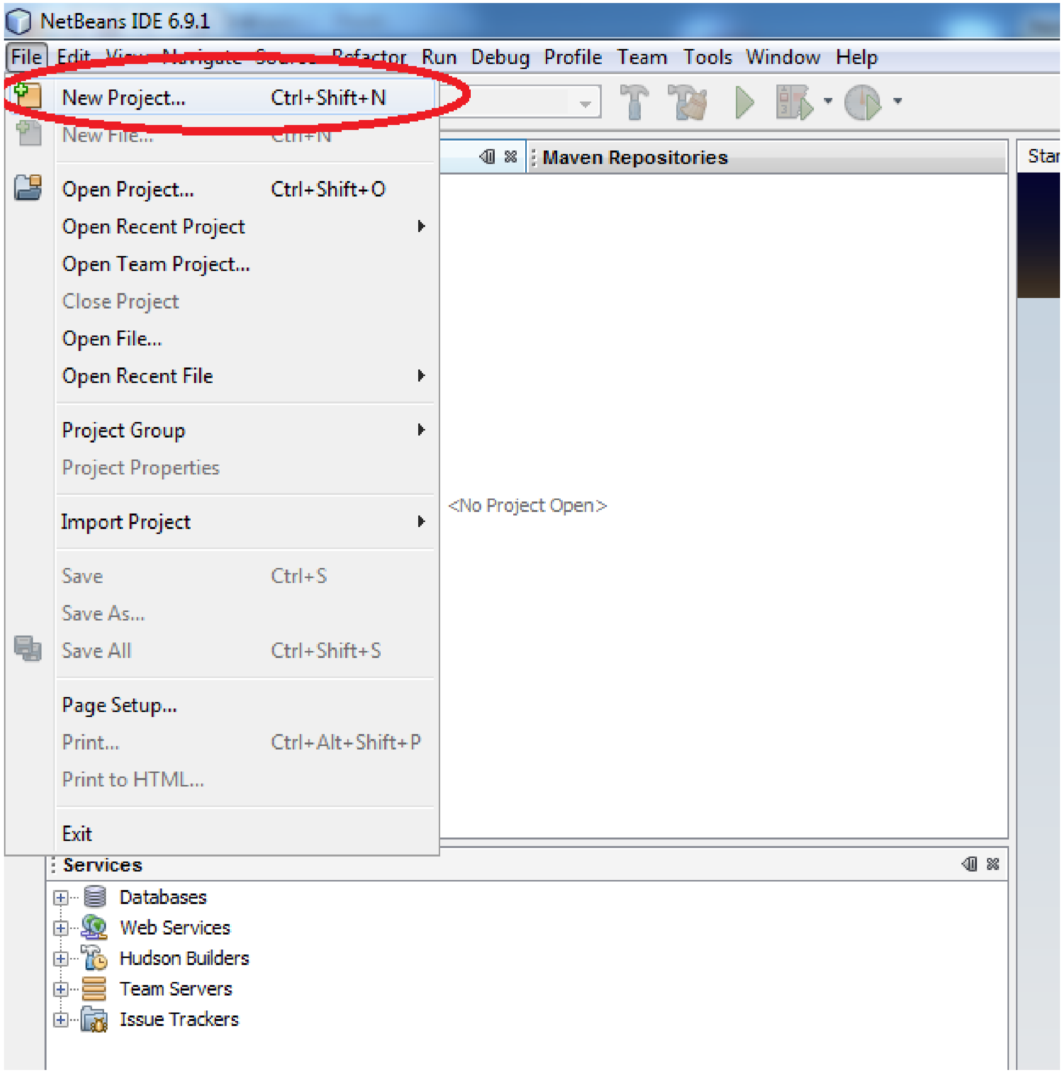
□ Skip Tests for any build executions not directly related to testing

Local Repository : <Use default local repository as defined by Maven>

Import bot project

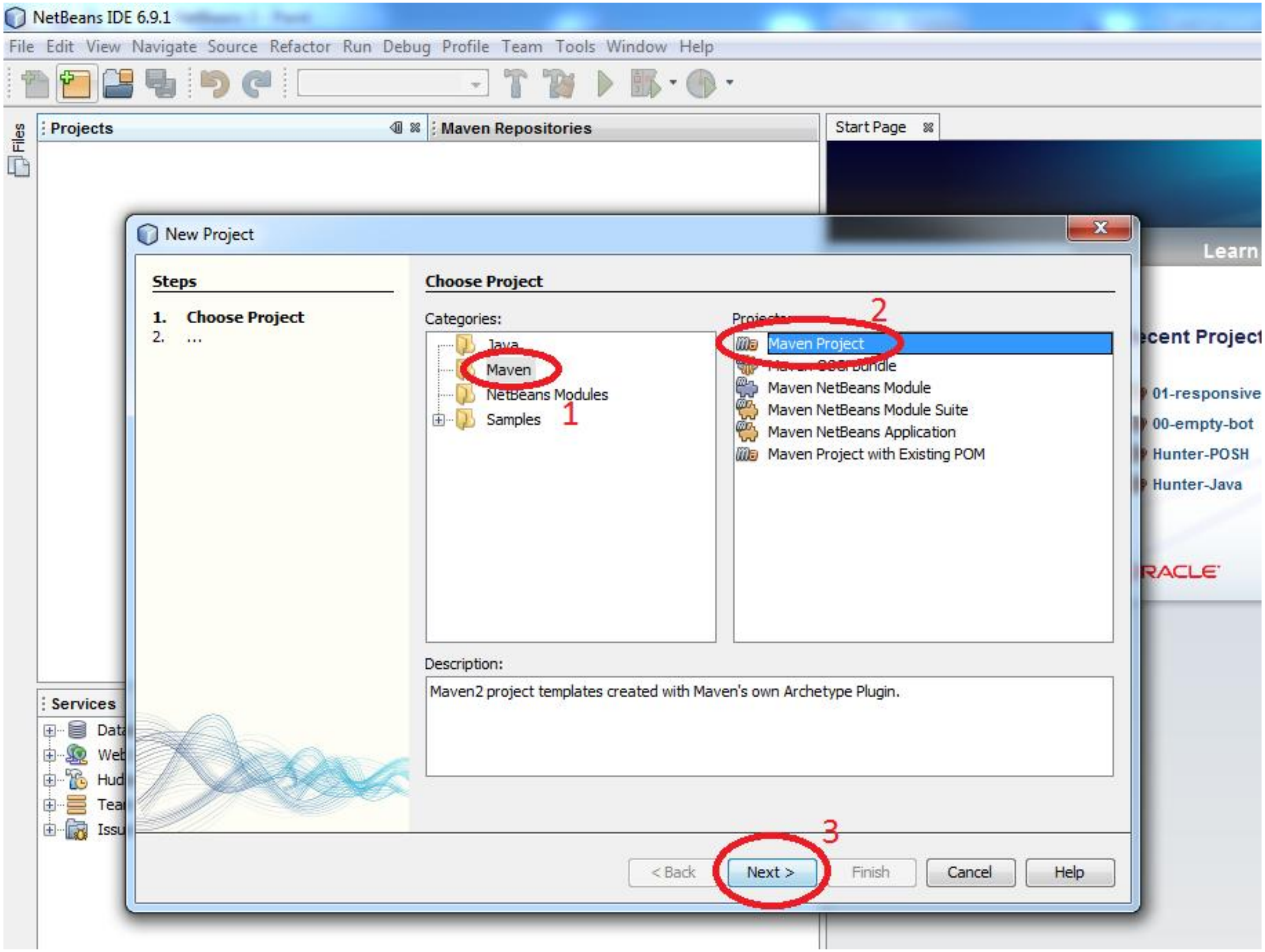
Step 6: Create new bot project

- Create new Maven project…



Import bot project

Step 6: Create new bot project



Steps

1. Choose Project
2. ...

Choose Project

Categories:

- Java
- Maven
- NetBeans Modules
- Samples

Projects:

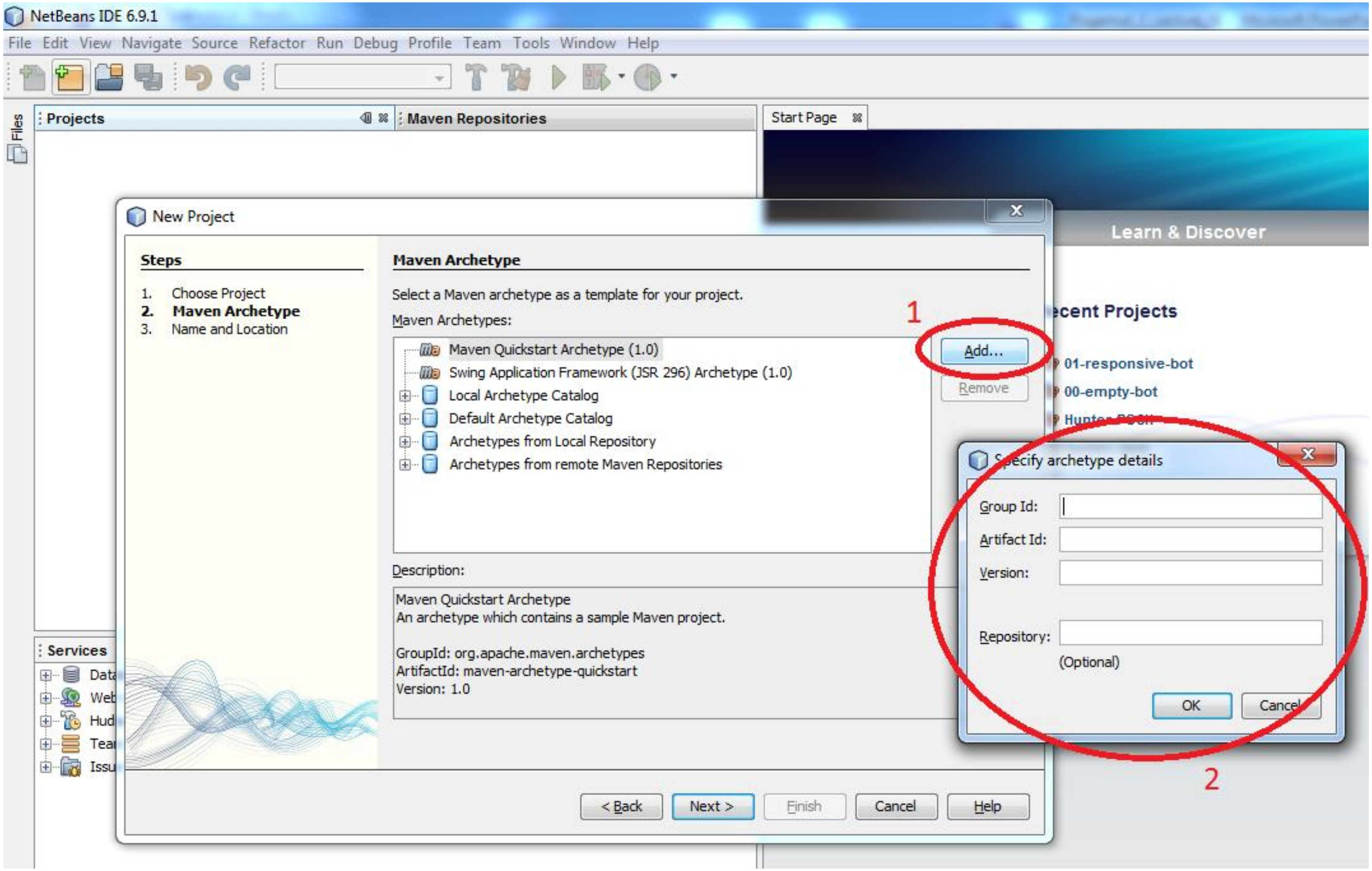
- Maven Project
- Maven OSGi Bundle
- Maven NetBeans Module
- Maven NetBeans Module Suite
- Maven NetBeans Application
- Maven Project with Existing POM

Description:

Maven2 project templates created with Maven's own Archetype Plugin.

Import bot project

Step 6: Create new bot project



New Project

Steps

1. Choose Project
2. **Maven Archetype**
3. Name and Location

Maven Archetype

Select a Maven archetype as a template for your project.

Maven Archetypes:

- Maven Quickstart Archetype (1.0)
- Swing Application Framework (JSR 296) Archetype (1.0)
- Local Archetype Catalog
- Default Archetype Catalog
- Archetypes from Local Repository
- Archetypes from remote Maven Repositories

Description:

Maven Quickstart Archetype
An archetype which contains a sample Maven project.

GroupId: org.apache.maven.archetypes
ArtifactId: maven-archetype-quickstart
Version: 1.0

Specify archetype details

Group Id:
Artifact Id:
Version:

Repository:
(Optional)

Import bot project

Step 6: Create new bot project

- Now… you need to know
  - GroupId
  - ArtifactId
  - Version
  - Repository
  - … of the Maven Archetype you wish to materialize
- Let's check:
  - http://diana.ms.mff.cuni.cz:8081/artifactory
  - http://diana.ms.mff.cuni.cz:8081/artifactory/libs-snapshot-local/archetype-catalog.xml

Import bot project

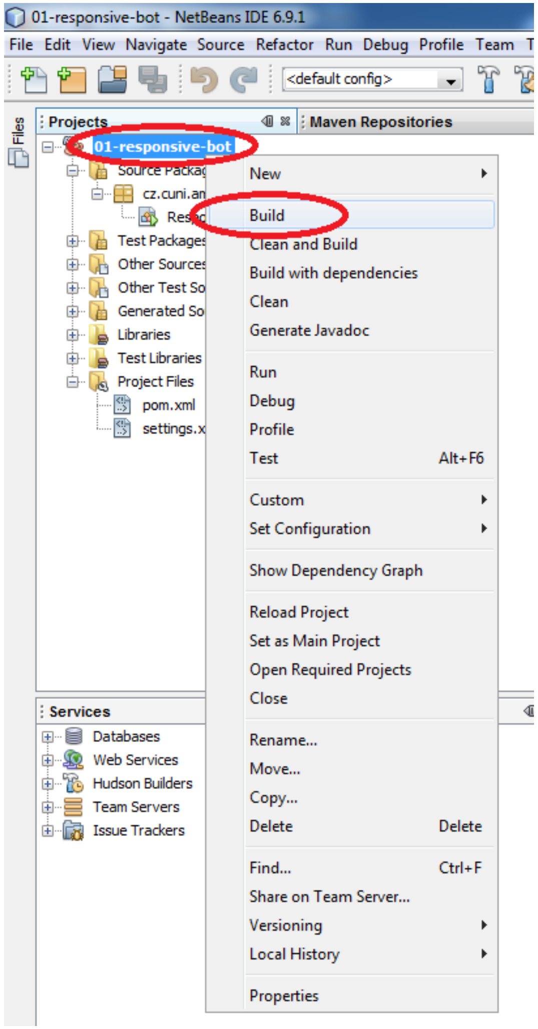
Step 6: Create new bot project

```
<archetype>
    <groupId>cz.cuni.amis.pogamut.ut2004.examples</groupId>
    <artifactId>00-empty-bot-archetype</artifactId>
    <version>3.2.0-SNAPSHOT</version>
    <repository>
          http://diana.ms.mff.cuni.cz:8081/artifactory/libs-snapshot-
    local
    </repository>
    <description>
          First PogamutUT2004 example. It features fully-runnable bot
          with no logic expalining the structure of the bot class. See:
          http://pogamut.cuni.cz/pogamut_files/latest/doc/tutorials/Em
          ptyBotTutorial.html
    </description>
</archetype>
```

Import bot project

Step 6: Open it!

- And Build it… it should have end with "BUILD SUCCESS"
- And Run it!
- Observe bot presence in UT2004



Tutorial 1 – Empty bot

- Now we have imported first Pogamut example bot!
- See the tutorial:
  - http://pogamut.cuni.cz/pogamut_files/latest/doc/tutorials/EmptyBotTutorial.html

…

- Let’s fool around ☺

Tutorial 2 – Responsive bot

```
<archetype>
    <groupId>cz.cuni.amis.pogamut.ut2004.examples</groupId>
    <artifactId>01-responsive-bot-archetype</artifactId>
    <version>3.2.0-SNAPSHOT</version>
    <repository>
        http://diana.ms.mff.cuni.cz:8081/artifactory/libs-snapshot-local
    </repository>
    <description>
        Second PogamutUT2004 example. It features bot that
    reponds to player when it sees him/her. See:
    http://pogamut.cuni.cz/pogamut_files/latest/doc/tutorials/ResponsiveBotTutorial.html
    </description>
</archetype>
```

Tutorial 2 – Responsive bot

- Second example bot!
- See the tutorial:
  - http://diana.ms.mff.cuni.cz/pogamut_files/latest/doc/tutorials/ResponsiveBotTutorial.html

…

- Let’s fool around again!

Assignment 1 (or HomeWork)

- Extend ResponsiveBot to follow the player as if it was a “dog”
- Go to JavaDoc
- Read about:
  - UT2004BotModuleController
  - CompleteBotCommandsWrapper
  - Players
  - …

Assignment 2 (or HomeWork)

- Extend ResponsiveBot to:
  - Start shooting the player when it can see him/her
  - Stop shooting when the player is lost from the view

Assignment 3 (or HomeWork)

- Extend ResponsiveBot to:
  - Remember last position of the player and if the player is lost, run to that location
  - If player didn't show up, start turning around to scan your surroundings

Send your assignments 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