

UE Artificial Intelligence

344.021, 344.022, 344.023
WS 2015

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Goals

- ▶ Apply knowledge you learned in the lecture
- ▶ Deepen your understanding of AI algorithms
- ▶ Program an AI for a simple computer game

Modus Operandi

Obligatory part

- ▶ **Four** (+1) assignments with multiple tasks
- ▶ Implementation of AI algorithms in JAVA
- ▶ Answer some theoretical questions

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Voluntary part

- ▶ Develop an intelligent agent for a simple game, either using algorithms learned in the lecture, or your own approaches
- ▶ Compete against other agents for fun ...
- ▶ ... and profit: if your agents are well-written and competitive, you can gain **bonus points** worth up to **one assignment**

Modus Operandi

- ▶ Both parts are to be done in **groups of two** persons
- ▶ Form groups until the **second class** at the **latest** (12.10.2015)
- ▶ You can use the MOODLE forum to pair up
- ▶ Not part of a group by then? You'll be assigned **randomly!**

Obligatory part - Assignments

- ▶ Assignment sheets will be provided via MOODLE
- ▶ A JAVA game framework will be provided via MOODLE
- ▶ Assignments will require you to implement AI algorithms within said game framework
- ▶ A small set of unit tests is provided, so you can test your implementations before you hand them in

Obligatory part - Handing in your Solutions

- ▶ Groups will hand in their solutions via MOODLE as well
- ▶ Each group has a total of **three “late days”**
- ▶ This means you can extend the deadlines three days **in total**
- ▶ You can hand in the first assignment three days late, but are then forced to submit the others on time
- ▶ Or you can hand in the first three assignments one day late each, etc...

Obligatory part - Grading

- ▶ Unseen unit tests
- ▶ Code reviews
- ▶ Max. points for a task depends on difficulty and effort
- ▶ 50% of total points are necessary to pass the class

Voluntary part - Task

- ▶ Groups will implement an intelligent agent (“bot”) that competes in a simple 1 vs. 1 computer game
- ▶ You can use algorithms learned in the lecture
- ▶ You can implement state-of-the-art solutions from literature
- ▶ You can also come up with your own schemes
- ▶ Agents of different groups will compete against each other

Voluntary part - Grading

- ▶ If you beat the best bot from last year, you get points worth as much as **one exercise**
- ▶ Every competing group will have to complete a small interview, so we can determine the exact number of points awarded
- ▶ The nature of the interview will depend on the number of competing teams
- ▶ “Too many” teams will shorten the time accordingly

The Game

Rainbows And Unicorns



The Game

- ▶ Friendly, violence-free version of an old game
- ▶ Search for “Eric and the Floaters”
- ▶ Obligatory part: single player with “quests”
- ▶ Voluntary part: 1 vs. 1
- ▶ There is a prosaic description of the rules
- ▶ The truth lies in the code itself

The Game

- ▶ Turn-based
- ▶ Zero-sum
- ▶ Deterministic
- ▶ Perfect information

The Game - Rules



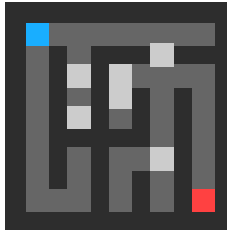
The board is a rectangular grid of walls and paths

The Game - Rules



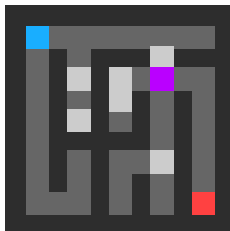
Two unicorns (red, blue) can move on the paths

The Game - Rules



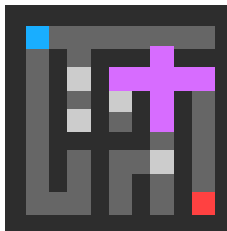
Clouds block the paths
(they are wet and unicorns do not like to get wet)

The Game - Rules



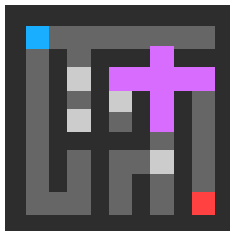
Unicorns can place three rainbow seeds, each

The Game - Rules



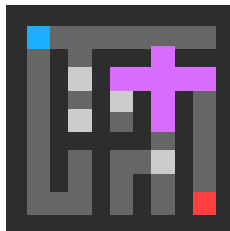
After few rounds, seeds spawn rainbows of length three

The Game - Rules



Rainbows make clouds evaporate
(they disappear)

The Game - Rules



If a rainbow touches a unicorn, the unicorn sails on it through the sky
(and loses the game)

The Game - Rules



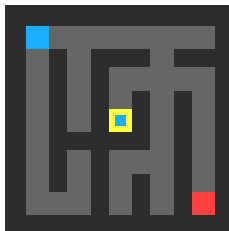
Boards can contain golden star fountains
(they emit one golden star per turn)

The Game - Rules



Fountains can be touched
(their stars will belong to the unicorn that last touched)

The Game - Rules



(until the other unicorn touches the fountain)

The Game - Rules

The game ends if:

- ▶ one of the unicorns goes sailing (remaining unicorn wins)
- ▶ both of the unicorns go sailing (draw)
- ▶ move limit is reached (unicorn with more golden stars wins)
- ▶ memory runs out while thinking (unicorn loses)
- ▶ time runs out while thinking (unicorn loses)

Voluntary part - Competition Mode

Start: 20.11.2015

End: 08.01.2016

- ▶ Groups upload their bots to the competition until Friday each week
- ▶ Bots play against each other during the weekend
- ▶ The bot with most wins ... **wins!**

Voluntary part - Competition Mode

- ▶ Each Monday, we publish the results:
 - ▶ The ranking of the most glorious unicorn agents
 - ▶ Replays, so groups can analyze the behavior of their own and the other agents
- ▶ The winner of the final ranking will get a prestigious trophy

Voluntary Part - Restrictions

- ▶ Each agent has a **total thinking time** of **5 minutes**
- ▶ Maximum memory usage is **512 MB**
- ▶ Breaking this contract leads to an immediate loss!

Administrative Stuff - All groups

(344.021, 344.022, 344.023)

► **Time and place:**

Monday 13:45 - 14:30 HS6

► **Website:**

<http://www.cp.jku.at/teaching/current/344.021.html>

► **Contact:**

rainer.kelz@jku.at
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Assignment Schedule

Assignment	Handout	Due	Discussion
A0	12.10.2015	19.10.2015	-
A1	12.10.2015	02.11.2015	09.11.2015
A2	09.11.2015	27.11.2015	30.11.2015
A3	30.11.2015	08.01.2015	11.01.2015
A4	11.01.2016	25.01.2016	-

If there is a group of students who wants one or more specific topics to be discussed in more detail, tell us via MOODLE.

If the group is **large enough**, there may an opportunity for us to meet on a Monday in **HS6** (here), after the lecture.

For **too small** groups we can offer you **the forum**.

Or personal appointments organized via email, if it is really necessary.

Competition Schedule

Round	Upload Deadline	Results
0	20.11.2015	23.11.2015
1	27.11.2015	30.11.2015
2	04.12.2015	07.12.2015
3	11.12.2015	14.12.2015
4	18.12.2015	21.12.2015
FINAL	08.01.2016	11.01.2016

Questions

