Game AI: Perspectives From the Trenches

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About Me

• BS in Computer Science from Northwestern in 2000

• 6 years at Mad Doc Software

• 2 years at LucasArts

• 2 years at Double Fine
Overview

• Goals of an AI programmer
• Constraints
• Case Studies
**Goals of an AI Programmer**

- Not to make cool AI
- Not even to make smart AI
- Everything is in service of the game and the gameplay
- The goal is to help create fun
Star Trek: Armada 2
Data Driven
Star Wars: TFU
Time to Live
Star Wars: TFU
Work is Disposable
Constraints

- Schedule
- Budget
- System resources
- Team dynamics
Schedule

- Unknown tasks equal unknown time and unknown results
- Finishing on time can be more important than doing it better
Budget

- AAA titles are a business
- If they aren’t profitable, they won’t make more
- Slipping your schedule increases the budget
**System Resources**

- AI isn’t the only system
- Graphics
- Audio
- UI
- Depending on your target system, you may have very little to work with
Working With Designers

• Designers are deciding what features they require of you
• Designers like to change their minds
• Don’t let a designer dictate how you implement it, always ask them what is the experience they want
Case Studies

• The job of AI programmer is very different in different genres of game
RTS: Empire Earth 2

- High level gameplay
- Top down view
- Large scale decisions
- Tactical and Strategic AI
RTS: Empire Earth 2

- Unit Movement
- Formations
- Pathfinding
- Pathfollowing
RTS: Empire Earth 2

- Many managers
- Build
- Resource
- Army
RTS: Empire Earth 2

- FSM
- A* and flood fill
- Grassfire algorithm
- Designer tunable build orders
Action: Star Wars: TFU

- Human sized scale
- Animation fidelity is crucial
- High degree of physical realism (within fantasy world bounds)
Action: Star Wars: TFU

- Simple FSMs
- Data driven abilities
- AI agents have simple visibility systems
- Voice cues
Games are an Industry

• AAA games must be profitable
• Innovation and invention can be costly and risky
• There is occasional room for trying new techniques, but usually only in the hands of a programmer and/or studio with a proven track record
F.E.A.R. Planner
Resources

• Damian Isla’s behavior trees
  http://www.bungie.net/Inside/publications.aspx

• Jeff Orkin’s F.E.A.R. planning system

• Civ IV source code
  http://www.2kgames.com/civ4/downloads.htm
Closing Thoughts

• Main requirement for making AI is passion and communication skills
• We are bringing the game to life, we need flexibility and the commitment to try until it feels right
• AI programming is improved by knowledge of innovations and the future will hopefully bring large changes