Games Agent Loop

Sense - >

Think - >

Act - >

Back to beginning< - Memory

Sensing Obtains information through vision, hearing, communication and touch *Examples* Hearing - Ambient noise, surfaces and occlusion Vision - Objects within viewing distance/angle of agent Communication - Communicate with other agents **Thinking** Decision making - Taking a condition/input Reasoning - Combination of knowledge and input Rationality - Action *Examples* Pathfinding Finite State machines Production rules **Acting** Carry out the results of the decision *Examples* Change location Play animation/sound effect Use a weapon **Memory/learning** Avoid having to repeat a calculation and predict future outcomes. Also improve agent reasoning. Data doesn't have to be stored in game agent. Can be stored in world's data structure.

Game Agent Types

Reflex Agents - Respond immediately

Goal-based Agents - Act to achieve their goals

Utility-based agents - Try to maximise their own happiness

Terminology

Autonomy -	Self Governing
Agent -	Anything that can be viewed as perceiving its environment through sensors and action upon that environment through actuators

FSM

A machine which models states, transitions between states and actions.

Box - Represents state

Line - Transition

Arrow with dot at end - Start state

Arrow with dot and circle - End State

Pathfinding

Crash and Turn

Simplest form of pathfinding

Crash into obstacle and move left or right

Breadth First

Expands nodes closest to start node

On the grid we examine the starting location, followed by one square, two squares away and so on.

Algorithm

1. Create open and closed list

2. Push initial state onto open list

3. Until goal state is found or open list is empty do:

a) Remove first element from openlist and call it current

b) If open list is empty return failure and quit

c) If current is goal return success and quit

d) For each rule that can match current do:

i) Apply rule to generate new state

ii) If new state and not already been visited, push new state on end of open list

Add current to closed list

3D Modelling

Computer games use 3D modelling tools to generate their content. e.g. Alias Maya, 3DS Max

Export in .X files to make them compatible for games

Game Loops and Timing

Game loop s render a static image of a scene. Objects are moved slightly on each iteration.

If there is no timing the loop will render as fast as possible

Variable timing - Time the game loop

Fixed timing - A constant value is chosen e.g. 0.02s (50fps)

Physics Engines

Rigid body - Representation of collision volume of an object

Joint - Represents a constraint on a body.

Hinge - Door opening and closing (1 axis)

Ball and socket joint - Shoulder movement (3 fixed axes)