CH 14: Strategy Games

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This is a war universe. War all the time. That is its nature. There may be other universes based on all sorts of other principles, but ours seems to be based on war and games.

—WILLIAM BURROUGHS
What are they?

• Strategic games challenge players to win through planning a series of actions.

• Key goal is often about reducing and eliminating enemy forces (ie. AOE games).

• Not all strategy games are about combat (ie. Monopoly, Dominos, Poker and Tic-Tac-Toe).

• Victory is achieved by superior planning and optimum actions.

• Leave nothing to chance, it plays a very small role.
• After centuries, these games developed into PC games
  
  • Allows for complex set of rules due to power of PCs

• Divides into two sub subgenres:
  
  • Classical turn-based games
  
  • real-time strategy games
Turn-base Games

• Players have time to think about their moves and consider the benefits each choice.

• In non-computer games, this will be a problem
  • can cause analysis paralysis.

• Computer Games do not have this problem.
  • Single player, computer doesn’t mind waiting for you
  • multiplayer, every player makes next move at the same time.
Real-time Strategy Games

- Developed after turn-based games.
- No turns, players do everything simultaneously.
- Victory achieved by the sharpest and quickest player.
Challenges

• Challenges usually include map exploration, acquiring resources and strategic conflict.
Strategic Conflict

- Combat between two players take place on a battle field using units.

- Units have different attributes (ie. transportation, medics, different types of fighting units) and stats.

- Victory is achieved by superior strategic attacks such as sneak attacks, creating diversions, cutting off enemy supply lines, killing the superior officers.

  - Games such as XCOM: UFO Defense use player’s ignorance of landscape heavily.

- Fog of War Video:
  
  - https://www.youtube.com/watch?v=gi29QPudrOw
  
  - https://www.youtube.com/watch?v=fdQDD57pg3M
• In campaign mode: AI has full vision of map all the time, compensation by weak AI.

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Economic Challenges

- In Chess, limited number of units.
- In PC games, small number of units + resources on map = freedom of purchase.
- Complex games offer variety of types of resources.
In strategy games, you’re the manager and you give commands.

Units follow orders according to AI programming for that type of unit:

- Move
- Attack
- Stop
- Hold
- Etc.
Early real-time strategy games were run on low powered CPUs.

Rock-Paper-Scissors (RPS) Model.

Challenge to anticipate what type of units the enemy will come with.
Numerical Attributes

- Modern games assign numerical attributes to players that will change when:
  - damage sustained
  - upgrades occur
  - ammunition consumed and etc.
Common Numerical Attributes:

- Health: different ways to recharge, may include armor.

- Weapons: 0-4 types of weapons, each with its own attributes such as power, fire rate, ammo, and etc.

- Range: Minimum and maximum range, used mostly on stationary units.
• Accuracy: chance of hitting enemy (0-1, never to always hitting).

• Defensive Dodging: ability to dodge enemy shot (0-1, never to always dodging).

• Speed: will vary between minimum and maximum depending on terrain.

• Turn Rate: the speed at which a unit can turn.

• The more realistic, the more attributes (mass, acceleration, colour/texture changes).

• Keep in mind, design rule is to never create invincible units.
Special Abilities

- Stealth
- Flying or Sailing
- Repair
- Transport
- Leadership

https://www.youtube.com/watch?v=UZOy96h_XJU
Computing Relative Value of Units

• When deciding the cost of units, think of their military value. This will roughly tell you the ability of a unit to inflict damage from a distance:

  • Attack Unit Value = max health $\times$ shot power $\times$ rate of fire $\times$ theoretical accuracy $\times$ range $\times$ max speed

• For defensive units, this is a rough formula:

  • Defensive Unit Value = max health $\times$ shot power $\times$ rate of fire $\times$ theoretical accuracy $\times$ range$^2 / 2$

• These formulas are relative. Used to compare attack units to other attack units, not defensive units.

• Important design rule: balance your game!
Health, Morale, and Fighting Efficiency

- Making damaged/wounded units fight at lower efficiency introduces another dimension of realism in games.
- This shouldn’t be followed to increase the fun factor of games.
- If your troops are wounded and they can’t fight as good, you don’t stand a chance at a come back.
Upgrades and Technology Trees

- In order to ensure your player considers weaker units, allow for upgrades.
- Weak units + upgrades can stand a chance against strong units.
Logistics

• Games can’t be too real, player won’t be able to keep up.

• In real life, multiple generals to command an army while in game, it’s just one player.

• Units don’t eat and sleep. Vehicles don’t require fuel and spare parts. Most games don’t care about ammunition.

• Remember, primary goal is to make it fun.
• Problem was CPU, now it's too not over complicate.

• Supply lines don’t exist in most games. Units never run out of supply to fight the war.

• Units receive upgrades immediately and workers can build infinitely without distribution channels as long as the city has the required resources.

• There are alternative options that some games follow:
  
  • Road building: create roads between city and factory.
  
  • Influence Maps: units within a certain radius of the city will have distribution.
Game World

- This is the setting of your strategy game:
  - Historical Setting
  - Modern Setting
  - Future Setting
  - Fantasy Setting
Hierarchical Finite State Machines

- Design your system as commands run down a real army.
  - Captain decides to secure a base. Commands his sergeants.
  - Sergeants then command their individual men.
- In your hFSM, create intelligent levels for each level of hierarchy.
- Top FSM says “Attack!” … FSMS says “The unit I was told to attack is dead, so I will look for another one to attack”… Sergeants FSM says “Your mission is accomplished, so cease fire and guard your position”
THE END
References

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