Engine Architecture Types

• Broadly, what are the two architecture types discussed for game engines?

• What are the differences?

Basic Game Physics

• What does step size matter when simulating game physics?

• How can step size be decoupled from frame rate/game loop rate?

Basic Game AI

• What is a decision tree?

• What are strengths vs. weaknesses?

• What is a hierarchical finite state machine? Why use it versus a “flat” state machine?

• Where is the “knowledge” in the above? How else might we approach AI?
Collision Detection

• What is *intersection testing*?

• Using *overlap testing*, how can you determine exactly when/where the collision occurred?

Pathfinding with Waypoints

• What is one potential problem with pathfinding using waypoints?

• What is a potential fix to the problem above?

Pathfinding with Waypoints

• What is one potential problem with pathfinding using waypoints?

  *Ans*: blind spots, waypoint generation, kinky paths

• What is a potential fix to the problem above?

  *Ans*: fine-grained graphs, flood fill, path smoothing

Pathfinding with a NavMesh

• Is a Navmesh a replacement for A*? Why or why not?
Pathfinding with a NavMesh

• Is a Navmesh a replacement for A*? Why or why not?
  
  Ans: No. A Navmesh is a replacement for a waypoint graph. Instead of points, the graph nodes are polygons, covering the walkable area. A* can still be used to chart the path.

Tuning Pathfinding

• Sketch you how might you “time slice” to limit the CPU load of pathfinding
  
  Ans: Create a PathPlanner that stores progress along path. Create a PathManager that allocates out “cycles” to registered PathPlanners. Allow for fixed number of cycles per tick.

Autonomous Movement

• What are the three main components of the “steering” model? What does each do?
Autonomous Movement

• What are the three main components of the “steering” model? What does each do?
  Ans:
  **Action Selection** – chose goals and plans
  **Steering** – Calculate trajectories, apply forces
  **Locomotion** – apply mechanics of motion

Steering force for Seek

• Given a vehicle with mass and velocity and a target, describe how “seek” works
  Ans:

Steering force for Seek

• Given a vehicle with mass and velocity and a target, describe how “seek” works

Combining Forces

• What is the blended approach to combining steering forces?

• What is the prioritized approach to combining steering forces?
Combining Forces

- What is the blended approach to combining steering forces?
  **Ans:** All steering forces are called, with weights providing balance

- What is the prioritized approach to combining steering forces?
  **Ans:** Steering forces are prioritized, called in order until one or max force is reached

Camera Control

- Related to advanced camera control:
  – What is “zoning”?
  – What are “dynamics”?
  – What is “blending”?
  – What are “rails”?

Camera Control

- Describe the design of a **camera zoning** approach.

- How can you design **camera dynamics** not to move the camera with every movement of the player?

Camera Control

- What is **blending**?

- As part of blending, what is **ease**?
Networking

• Should multi-player computer games use TCP or UDP as a transport protocol? Why?

• Why does NAT make it difficult to provide for a two-person, networked computer game?

Latency and Games

• What are the main ways that latency can affect player performance in network games?

Graphics

• What are the primary differences between GPUs and CPUs. Consider both performance and the architecture.

• What is a light probe? What is it used for?

• What is Level of Detail geometry? How is it used?