

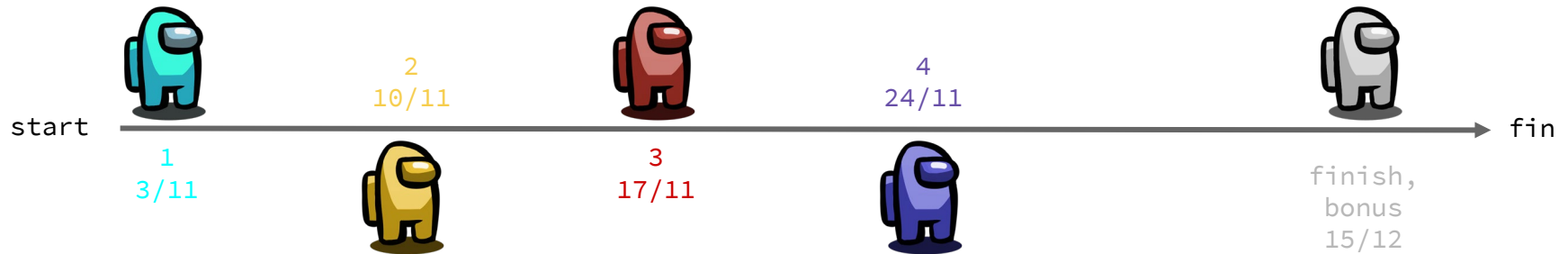
PHYSICALLY-BASED SIMULATION FINAL PROJECT: AMONG US

Crewmates:
Tianhong Gan, Yelan Tao

Group 6

MILESTONES + TIMELINE

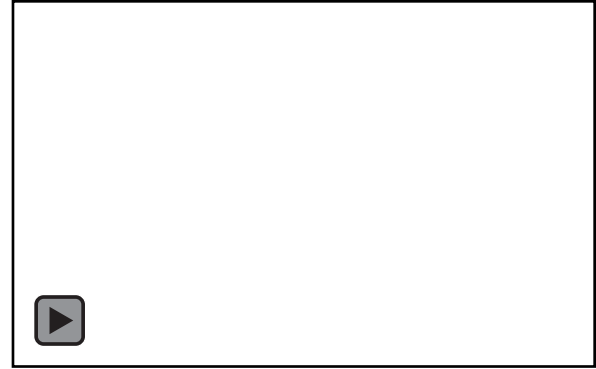
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2. add avatar to the screen
3. add basic real-time motion simulation (walking)
4. rigid-body collision between avatars
5. soft-body (MSS) collisions between avatars (bonus)
6. basic kill simulation (bonus)
7. sound effects (bonus)



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start

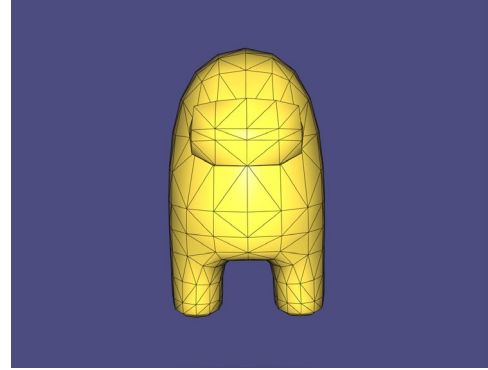


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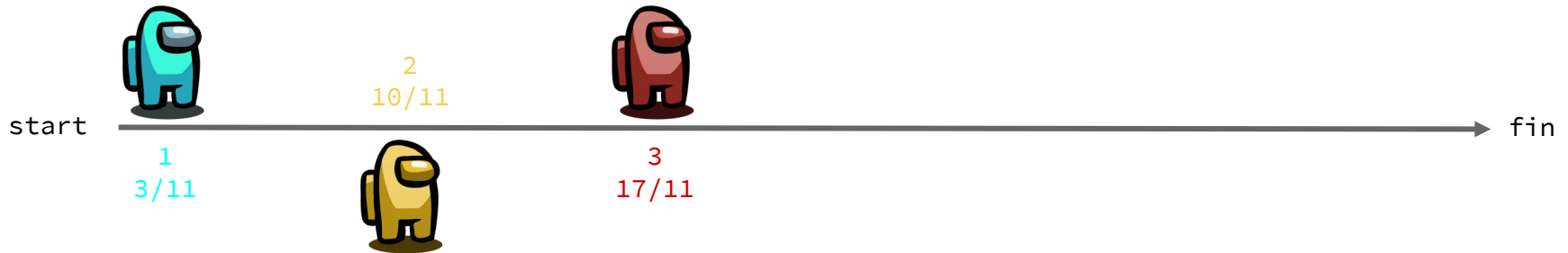
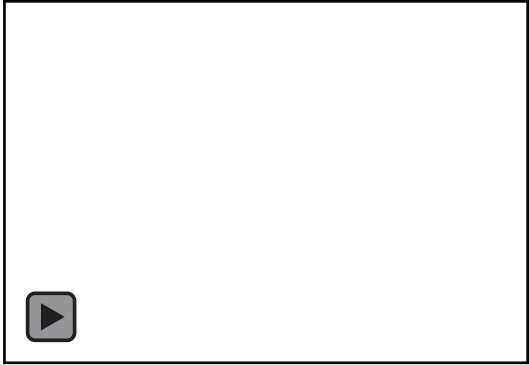
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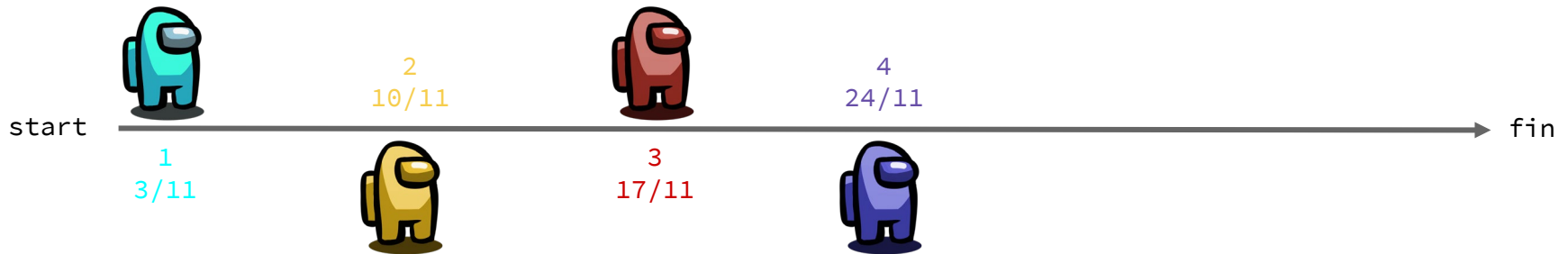
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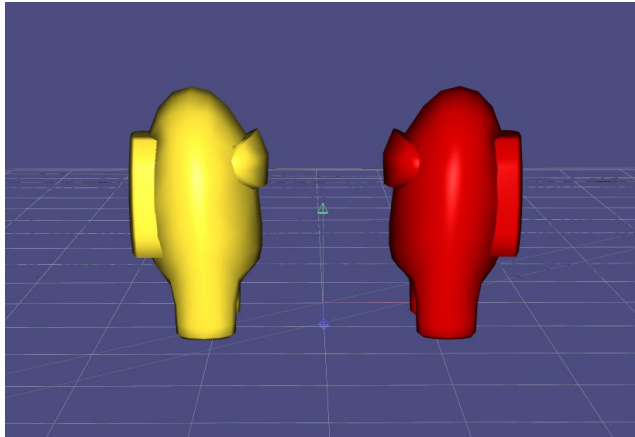
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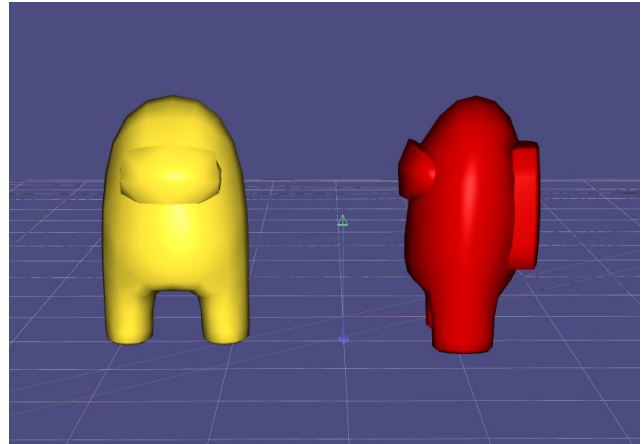
PROBLEM 1: COLLISION

- collision computation on full mesh is too slow:
 - use instead an AABB bounding volume around the mesh
 - compute collision and impulse with the AABB bounding volume
 - rectangle is sufficient due to how real-time movement is implemented

face - face



face - side



PROBLEM 2: COLLISION

- avatars move through each other and walls when too fast:
 - limit the speed of the avatars
 - reduce the time-steps
 - increase size of collision elements

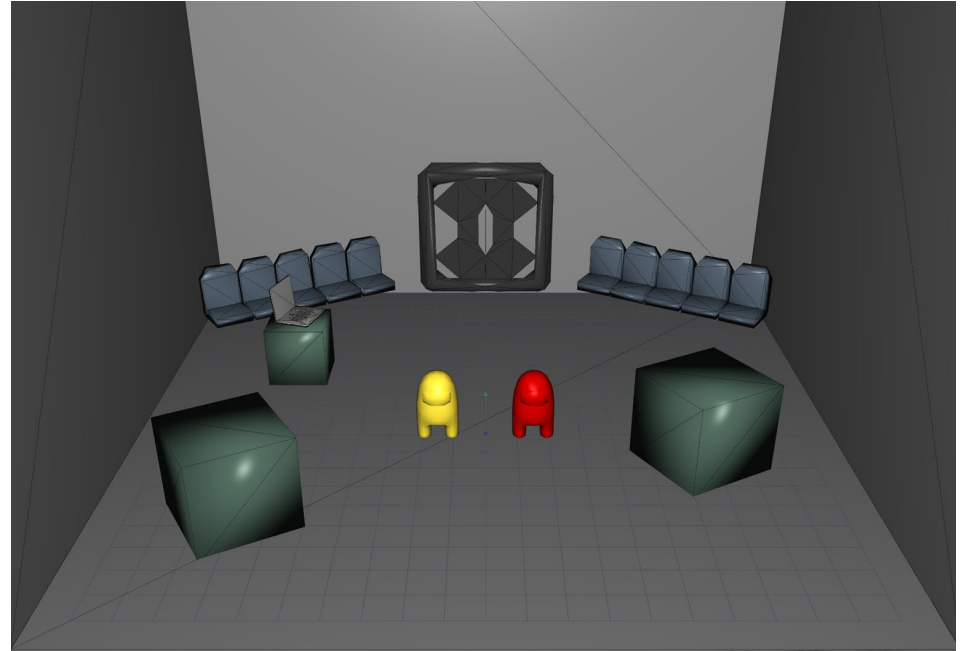


PROBLEM 3: RESTING CONTACTS

- avatars sometimes sink into the ground when standing still:
 - apply upwards force to counteract gravity when avatars are still (did not work)
 - remove gravity when the avatars are still (did not work)
 - apply upwards force to counteract gravity when avatar is on the ground (worked)



AMONG US MAP (BONUS!)



SUMMARY + GRADING CRITERIA

- stability:
 - collision works mostly between 'avatar ⇔ avatar' and 'avatar ⇔ environment'
- complexity:
 - avatar and map both implemented in 3D
 - collision detection uses bounding volume to speed up process
- performance:
 - real-time movement and control by applying force real-time
 - fast!
- results + presentation

FINAL VIDEO



THANKS FOR LISTENING!