

Physically-Based Simulation

Final Presentation: Sand Simulation

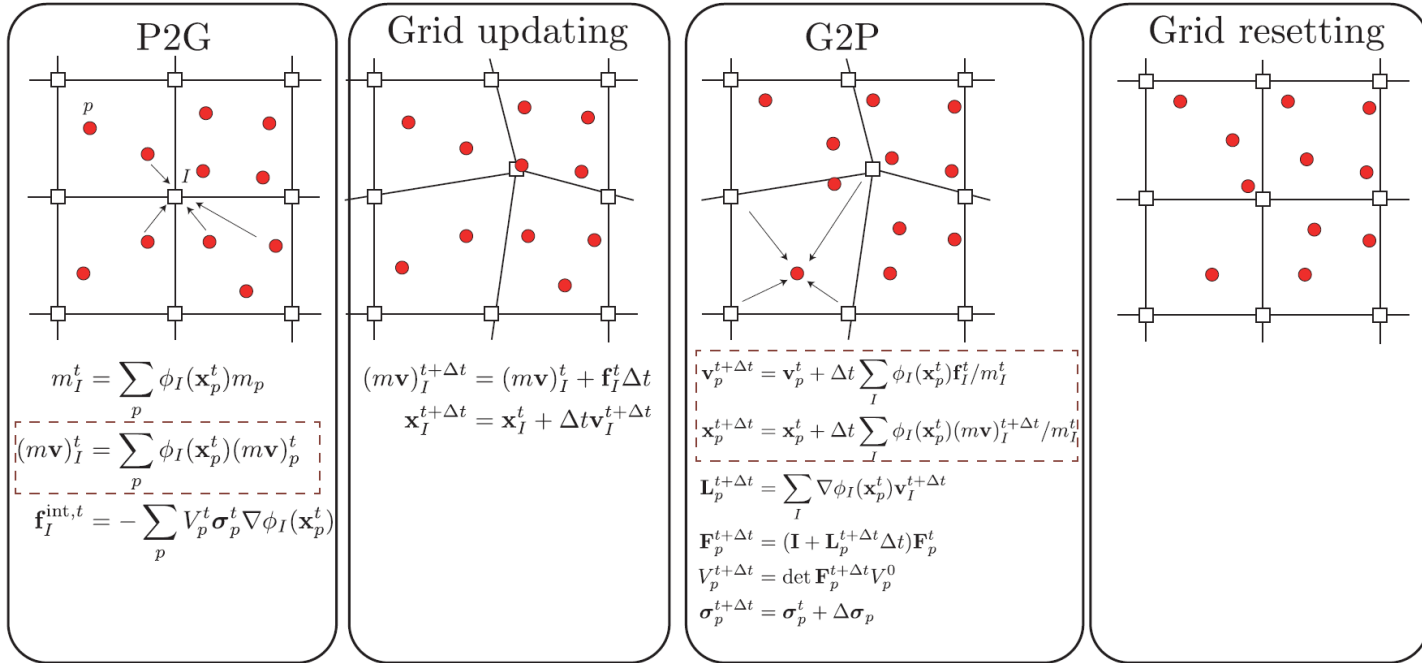
Group 15

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Simulation Overview

- Since last time:
 - More complex rigid body dynamics: rotation, collision handling, etc.
 - More complex scene settings.
 - Improve performance by OpenMP and precomputed level sets.
 - Simple rendering in blender.

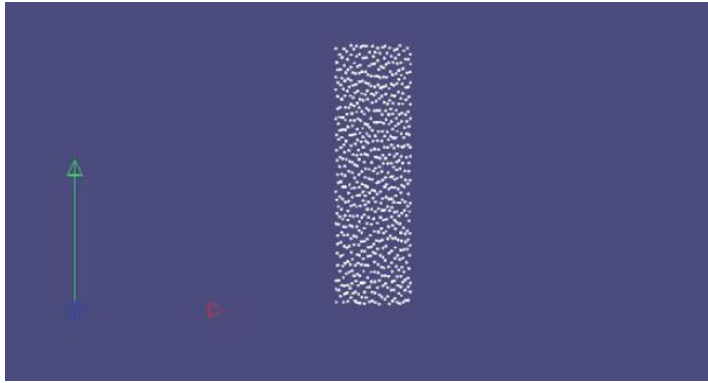
MPM Brief Intro



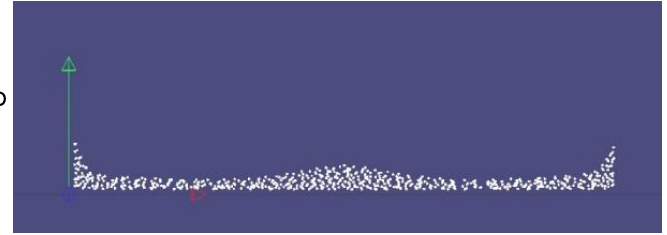
Collision Handling

- With boundary:
 - Separating: If a node is already inside a collision body, then it should not penetrate any deeper.
- With rigid bodies:
 - Using level sets to determine collision and using the normal direction to compute the impulse.

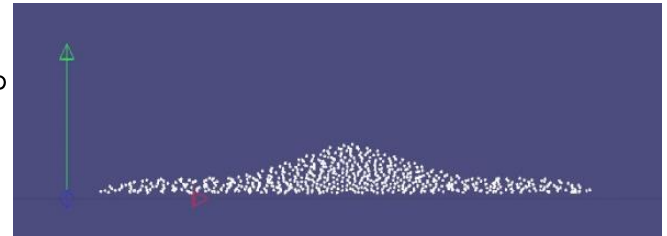
Demo Different Parameter



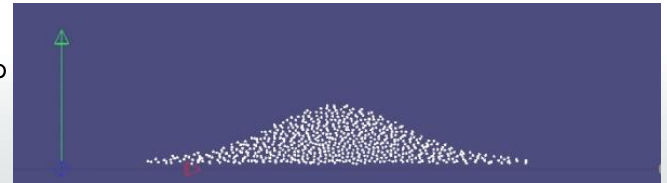
$$H_0 = 10^\circ$$



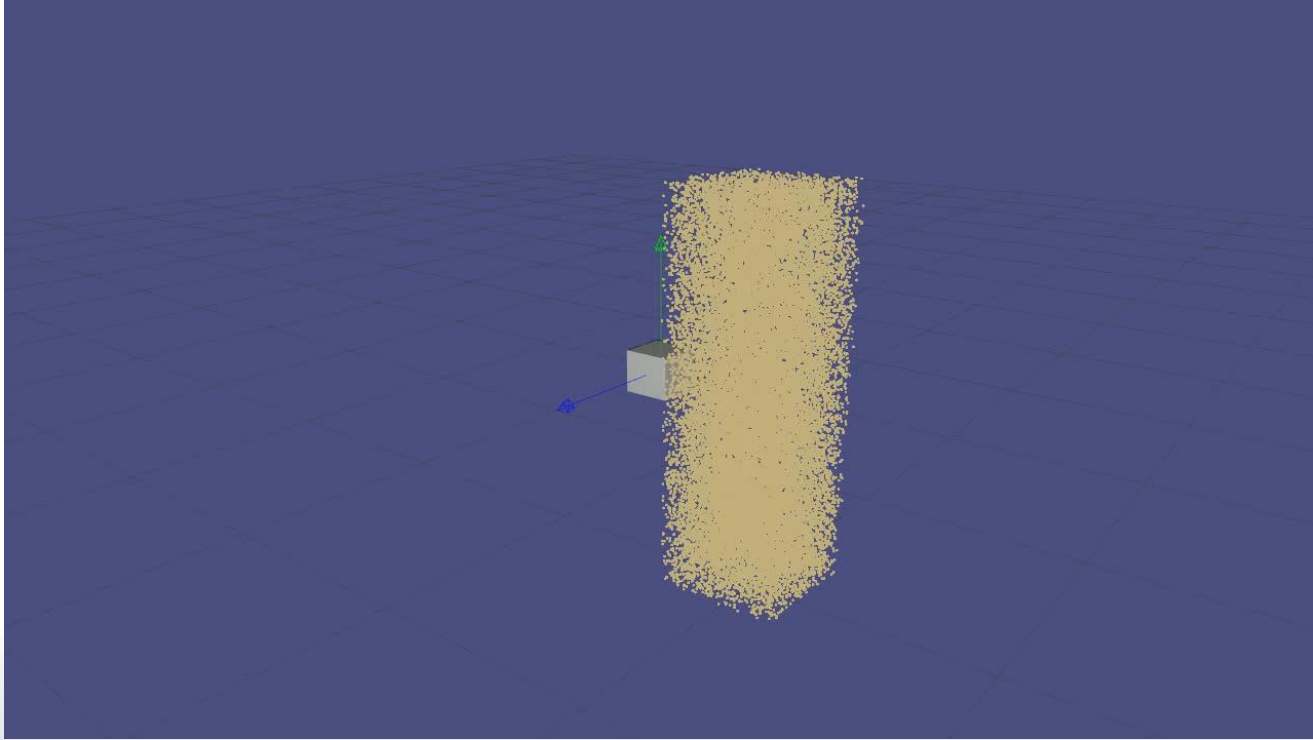
$$H_0 = 35^\circ$$



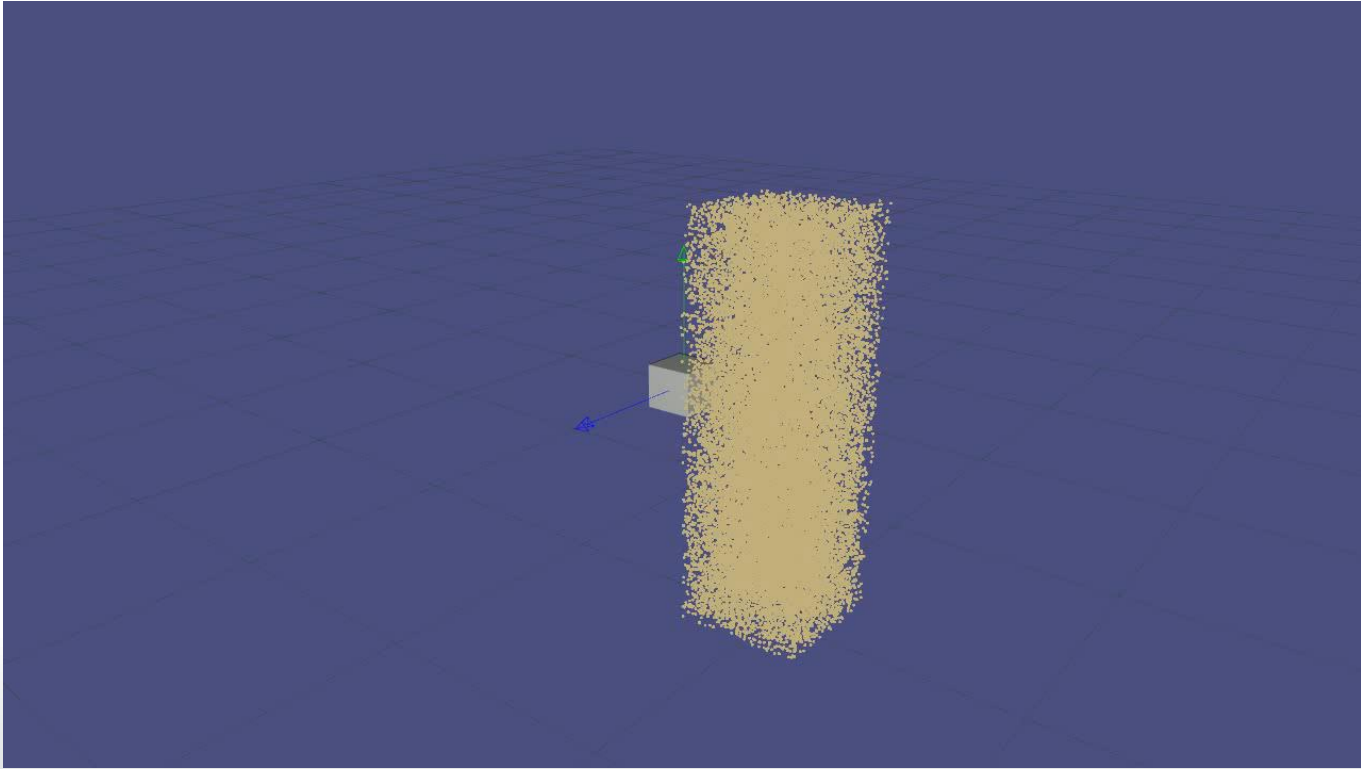
$$H_0 = 50^\circ$$



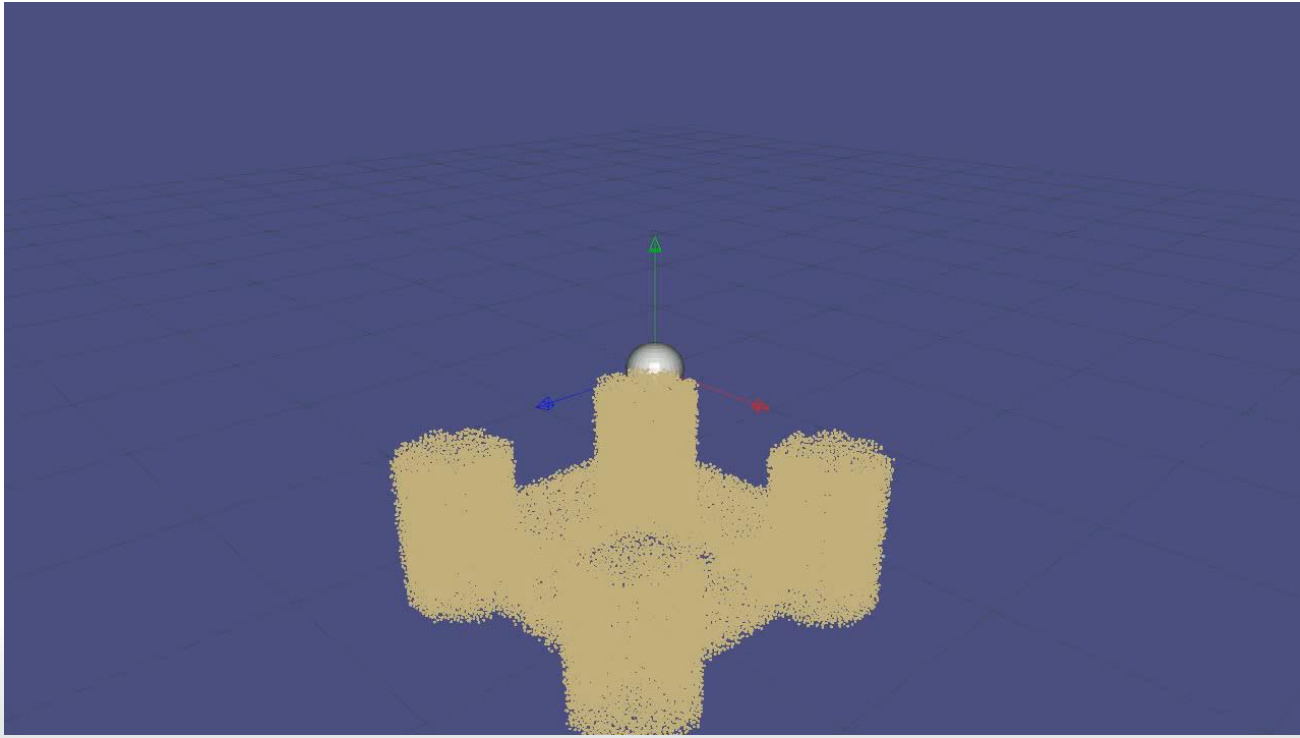
Demo-Rigid Body



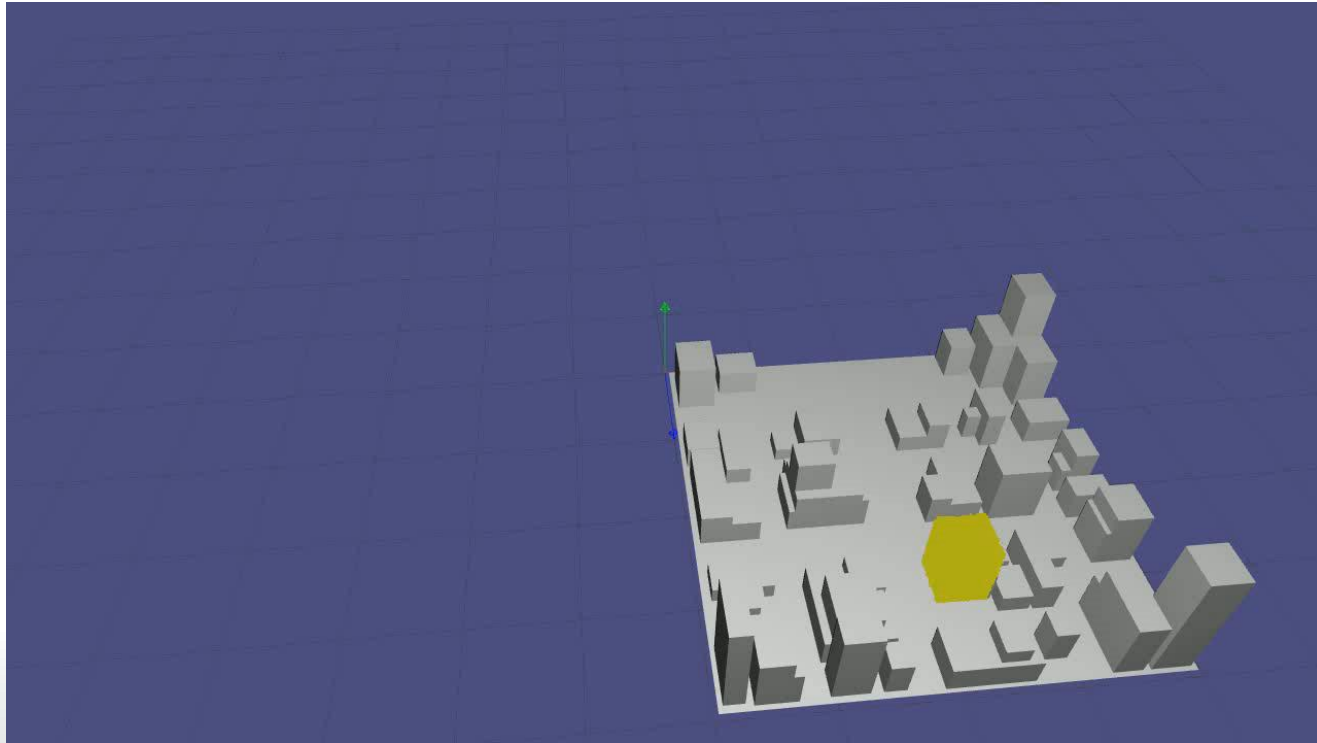
Demo-Rigid Body



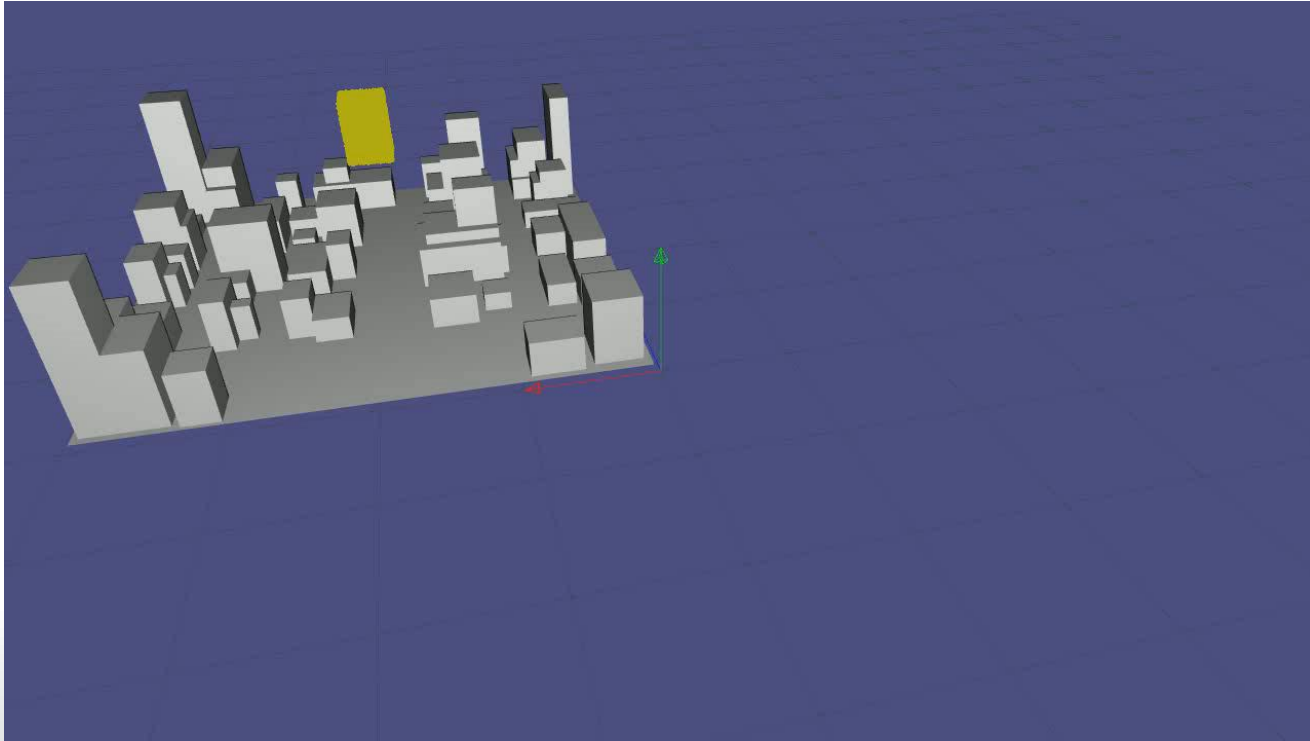
Demo-Sand Castle Hitting



Demo-Sand Flood in City



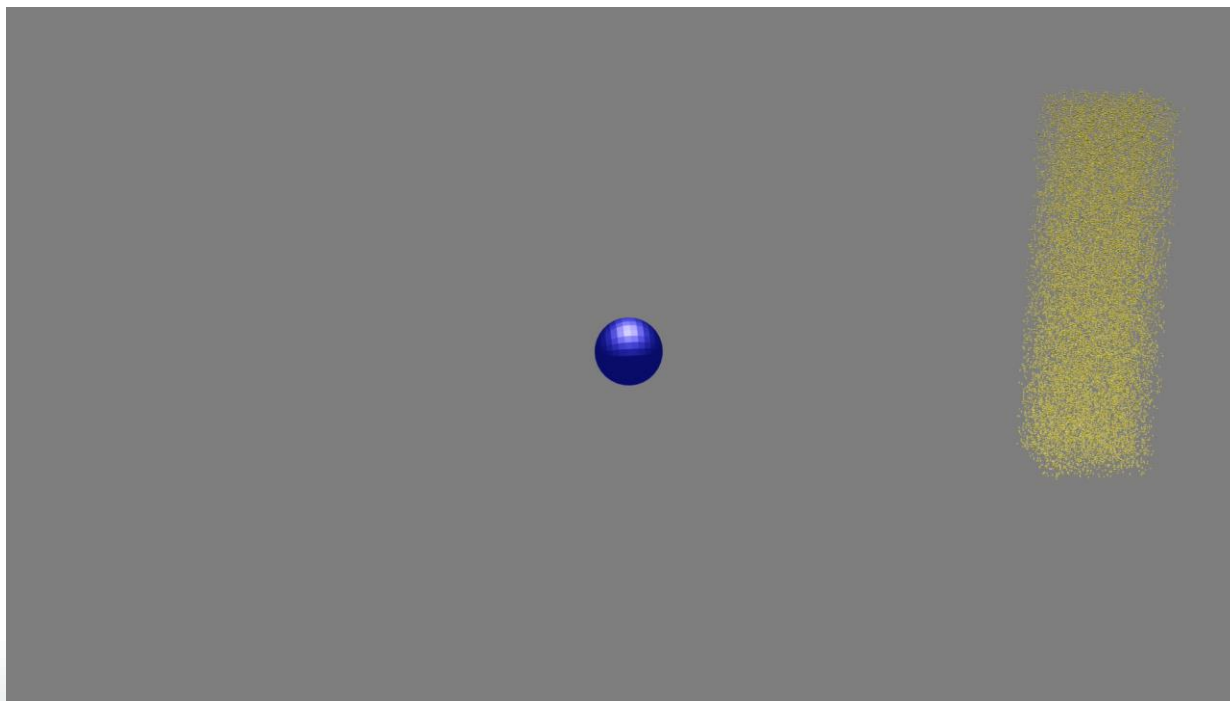
Demo-Sand Flood in City



Demo-Rendered Result



Demo-Rendered Result



Thank you very much!
Questions?