



Multiphase Flow Ansys Fluent



Eno Shira

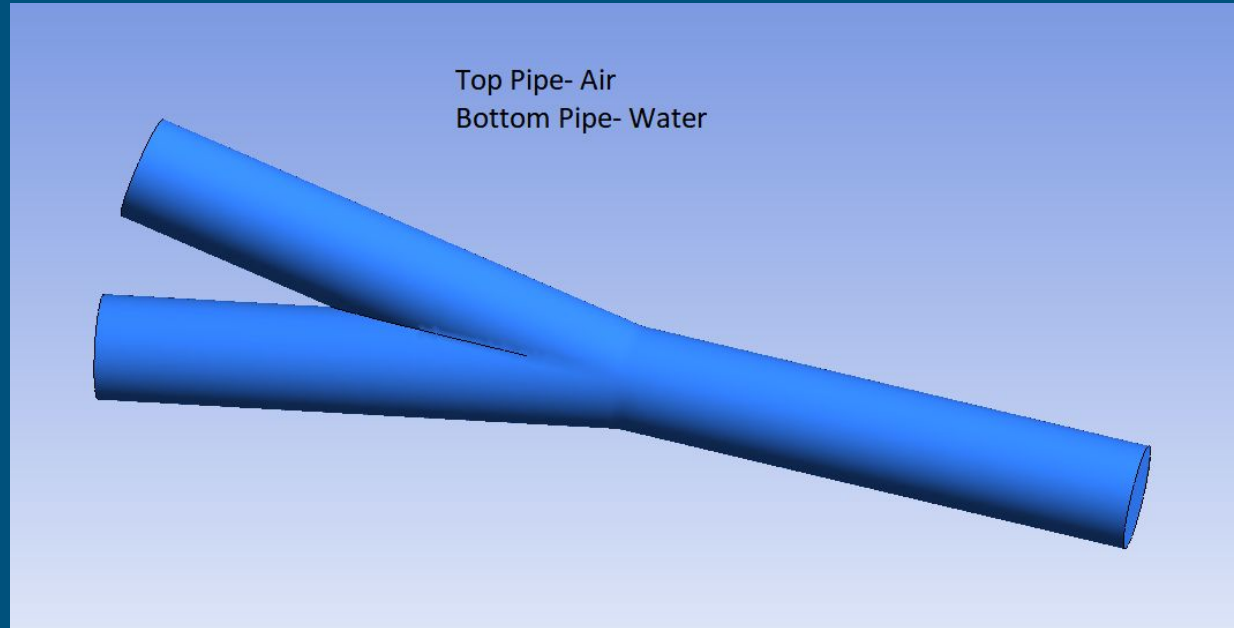


Overview

- Multiphase Flow in a system
 - Ex: River Flow
 - Water phase top layer, air phase bottom layer
- Changes in flow based on velocity variations of fluids
- Changes in flow based on geometry variations
 - Size of pipe

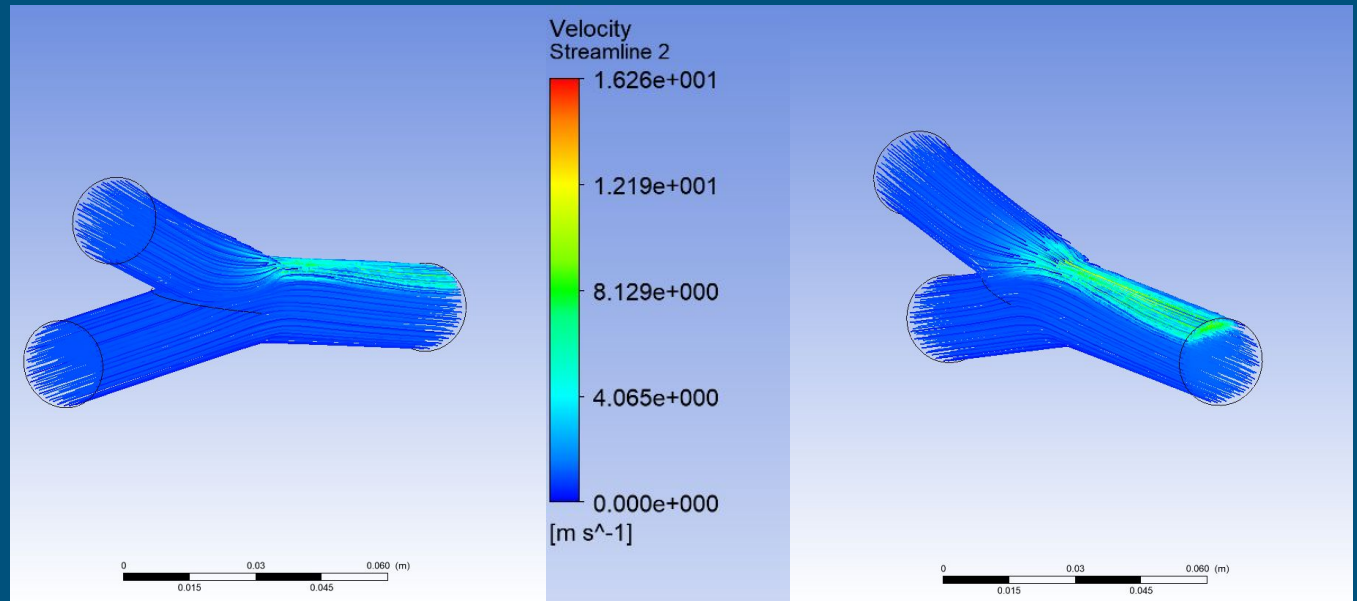
Working Geometry- Small Pipe

- Initially Air
- 10 cm “fused pipe”
- 10 cm inlet pipes
- 2 cm diameter pipe

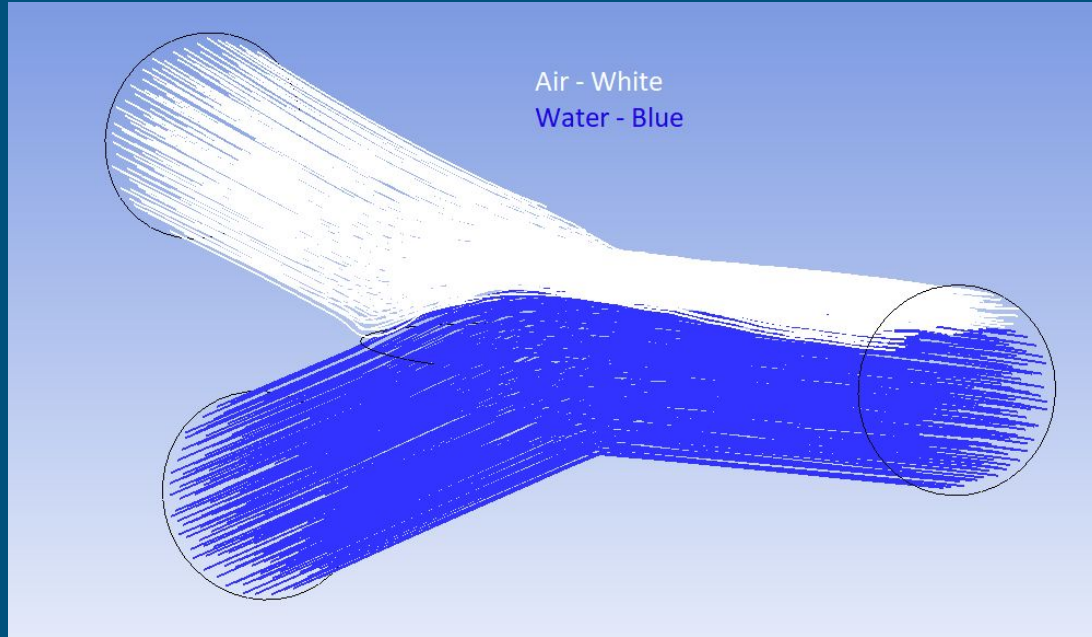


Trial 1: Equal Velocity Air/Water

- Air initial velocity: 1 m/s
- Water initial velocity: 1 m/s

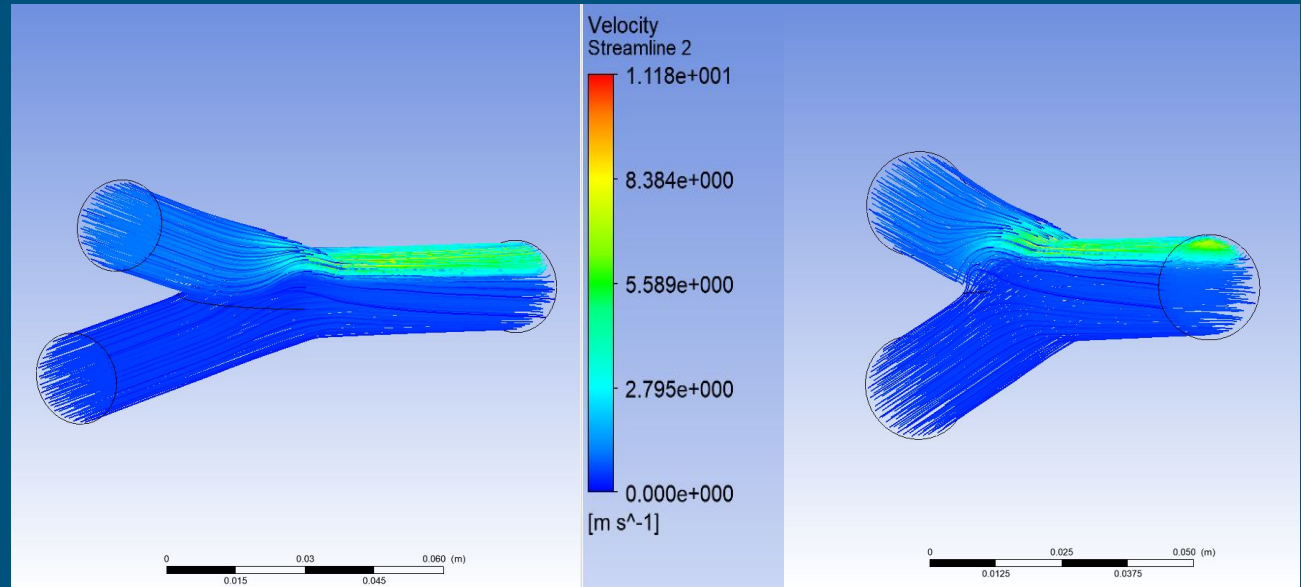


Phase Distribution - Trial 1

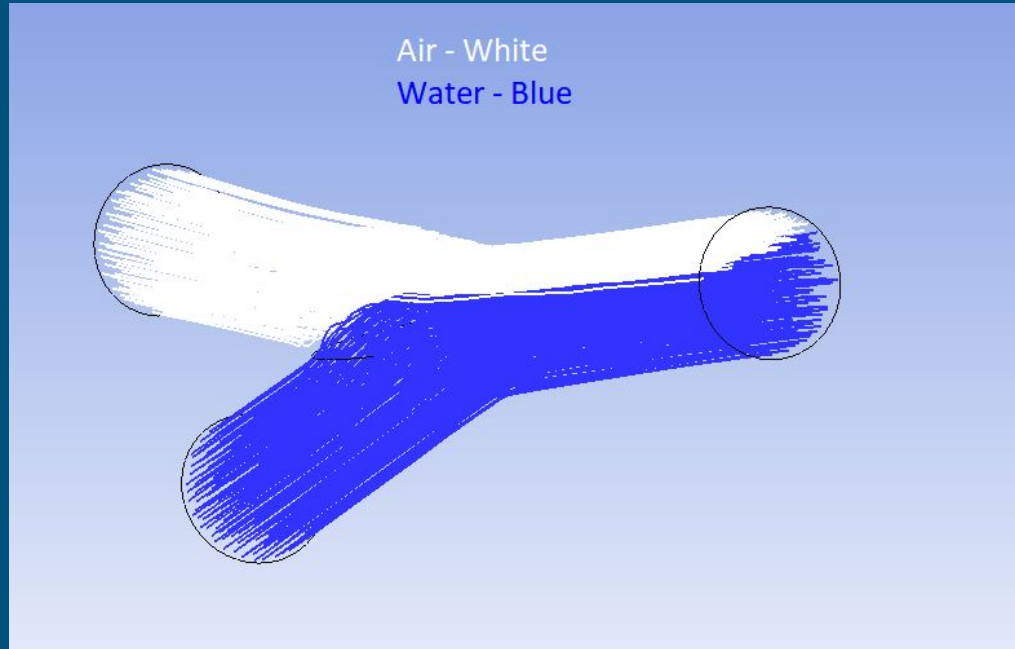


Trial 2: Higher Velocity Air

- Air initial velocity: 1 m/s
- Water initial velocity: 0.5 m/s

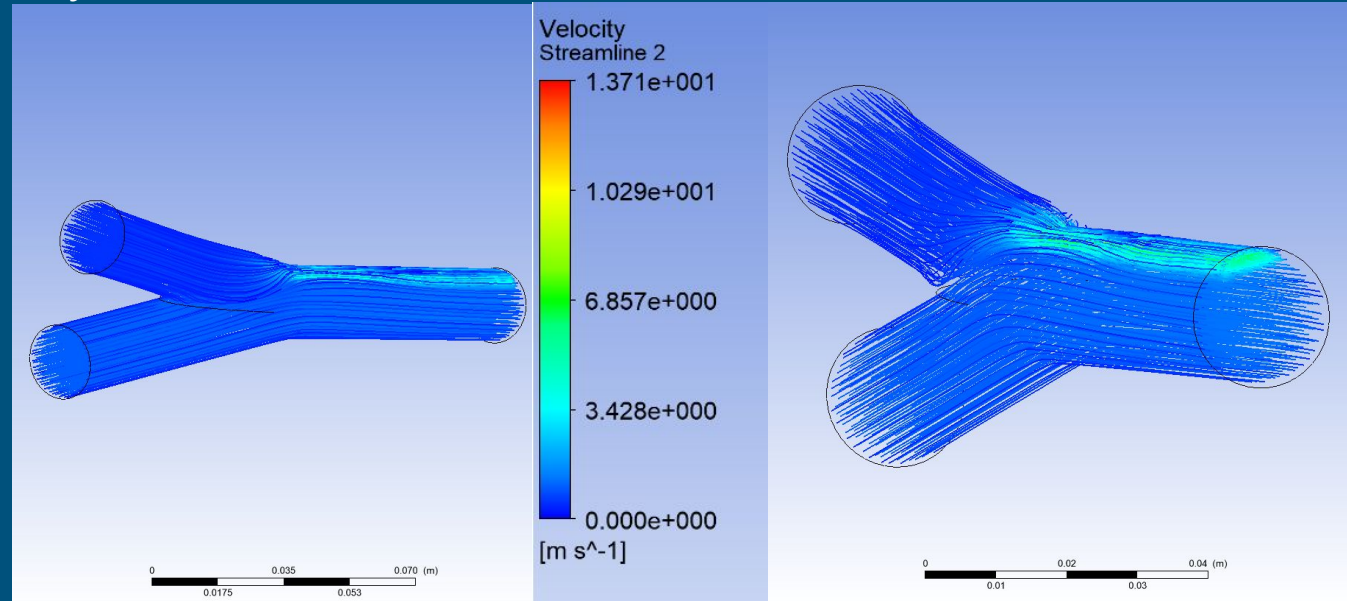


Phase Distribution - Trial 2

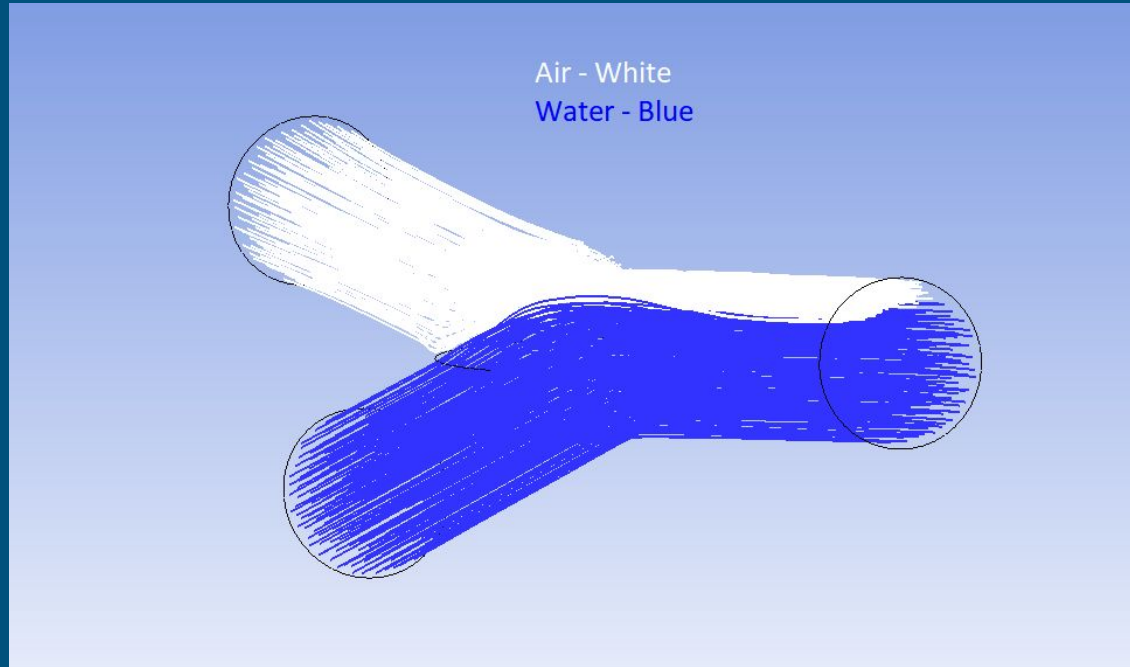


Trial 3: Higher Velocity Water

- Air initial velocity: 0.5 m/s
- Water initial velocity: 1 m/s

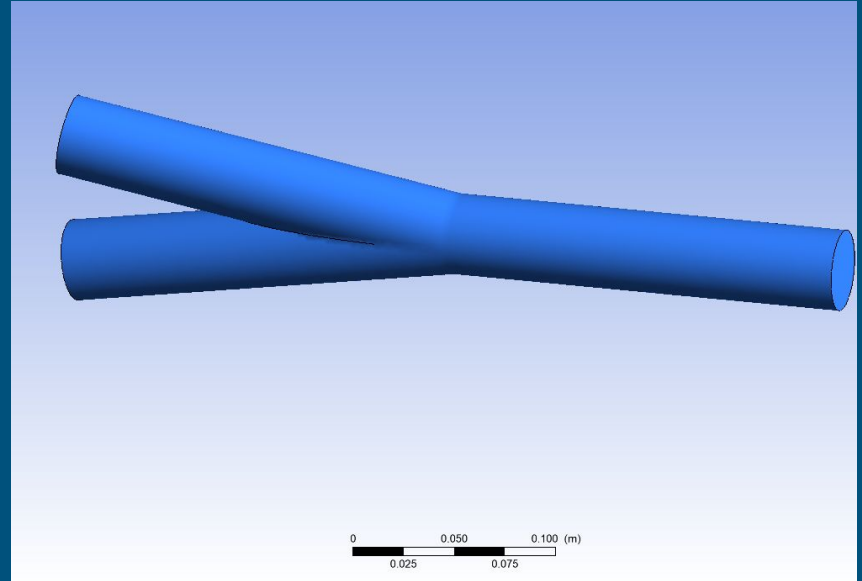


Phase Distribution - Trial 3



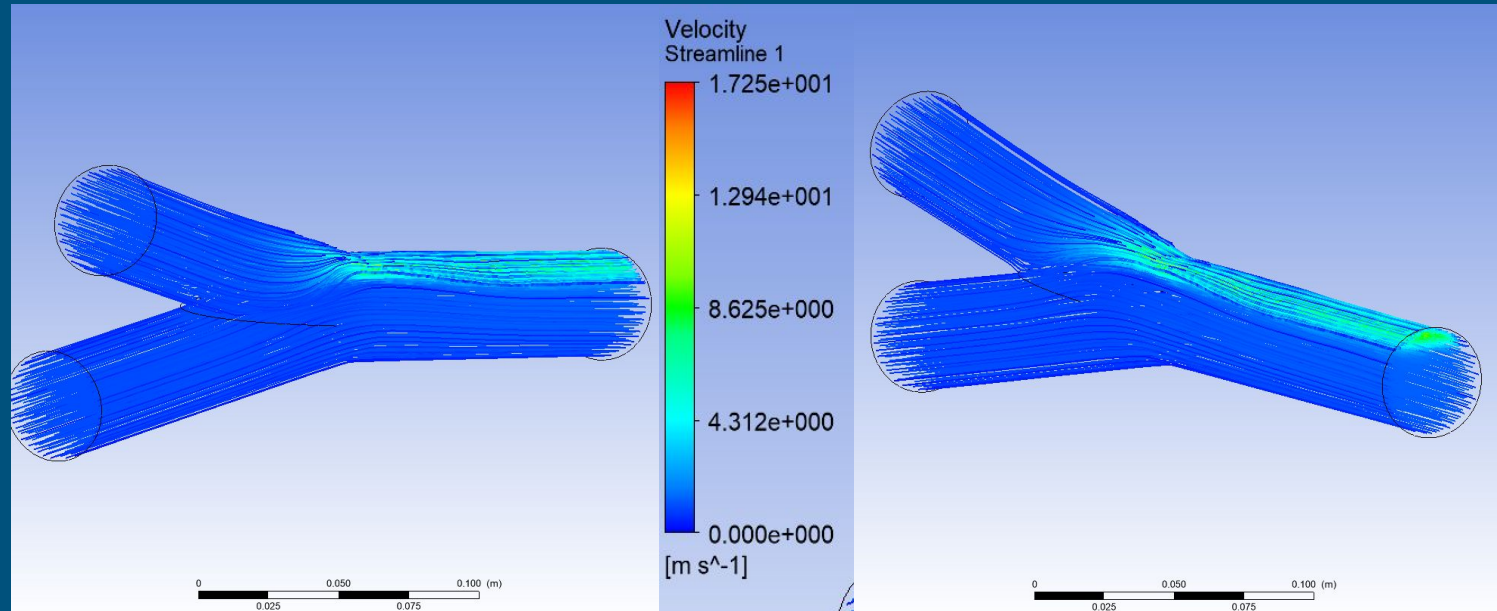
Working Geometry 2 - Larger Pipe

- Initially Air
- 20 cm “fused pipe”
- 20 cm inlet pipes
- 4 cm diameter pipe

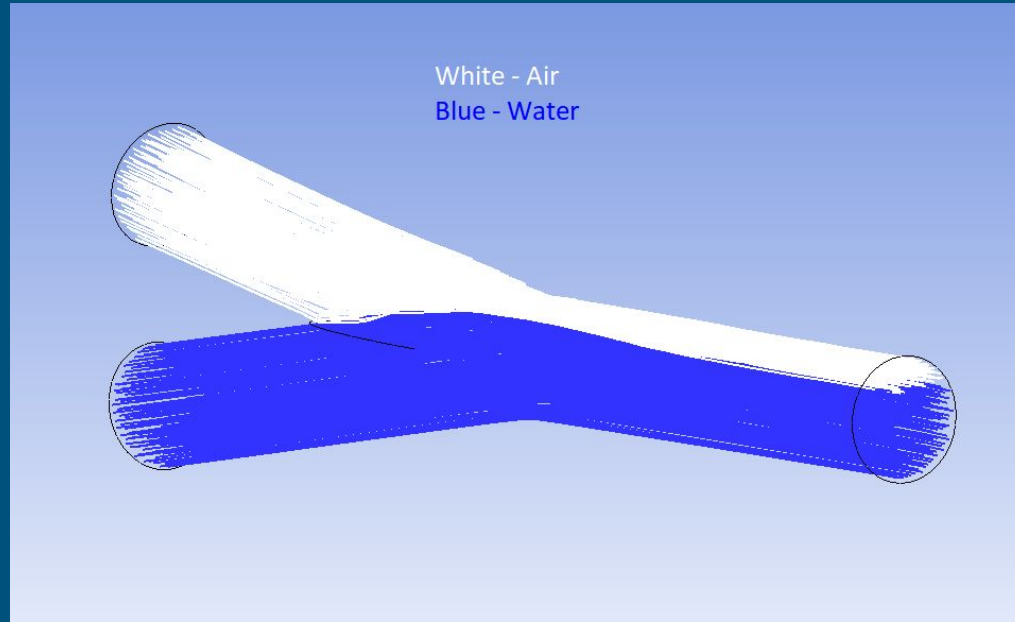


Trial 1: Equal Velocity Air/Water

- Air initial velocity: 1 m/s
- Water initial velocity: 1 m/s

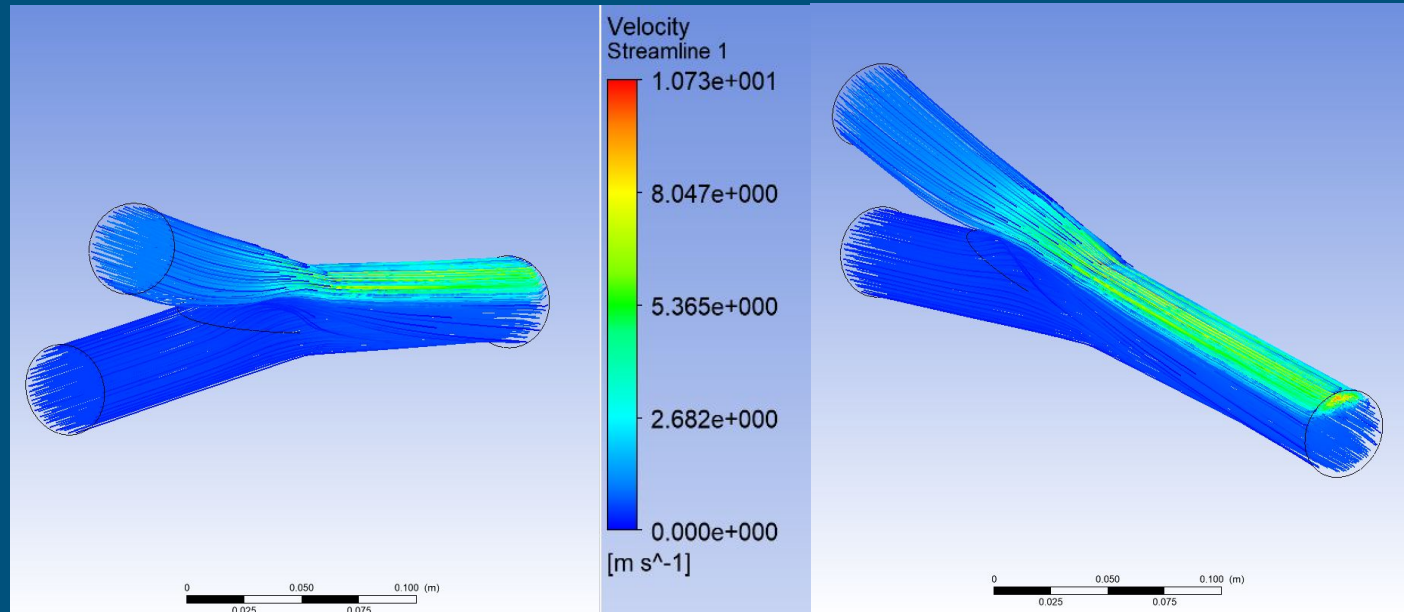


Phase Distribution - Trial 1

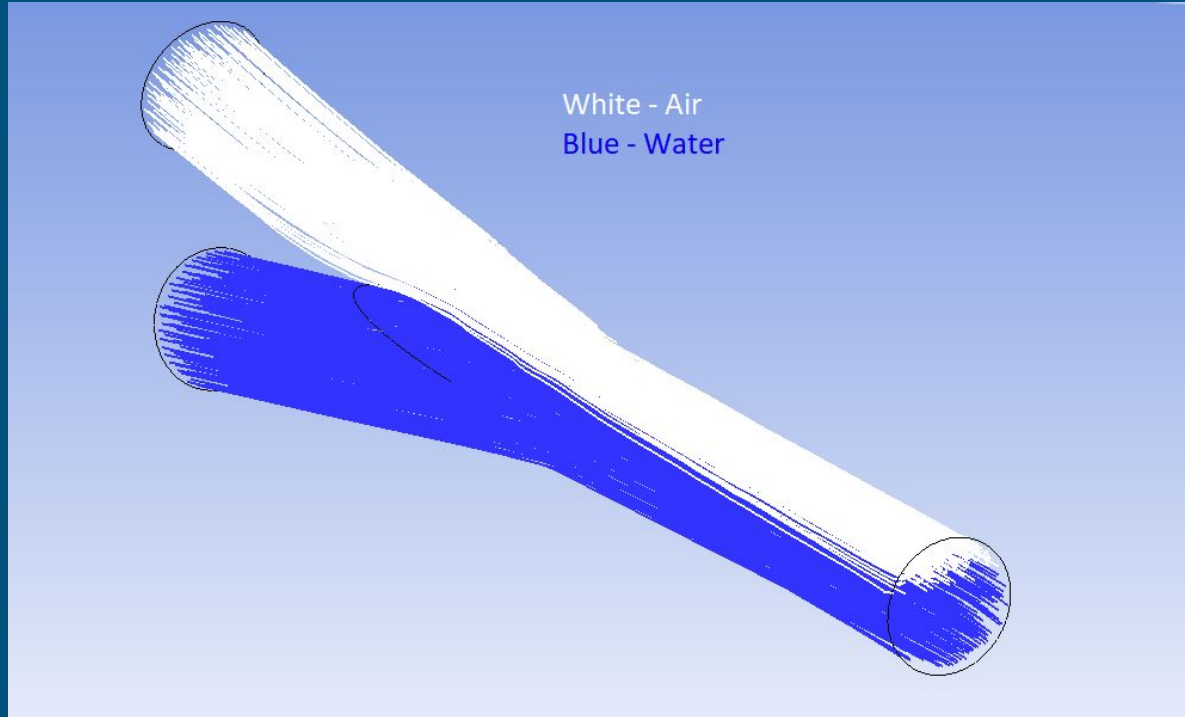


Trial 2: Higher Velocity Air

- Air initial velocity: 1 m/s
- Water initial velocity: 0.5 m/s

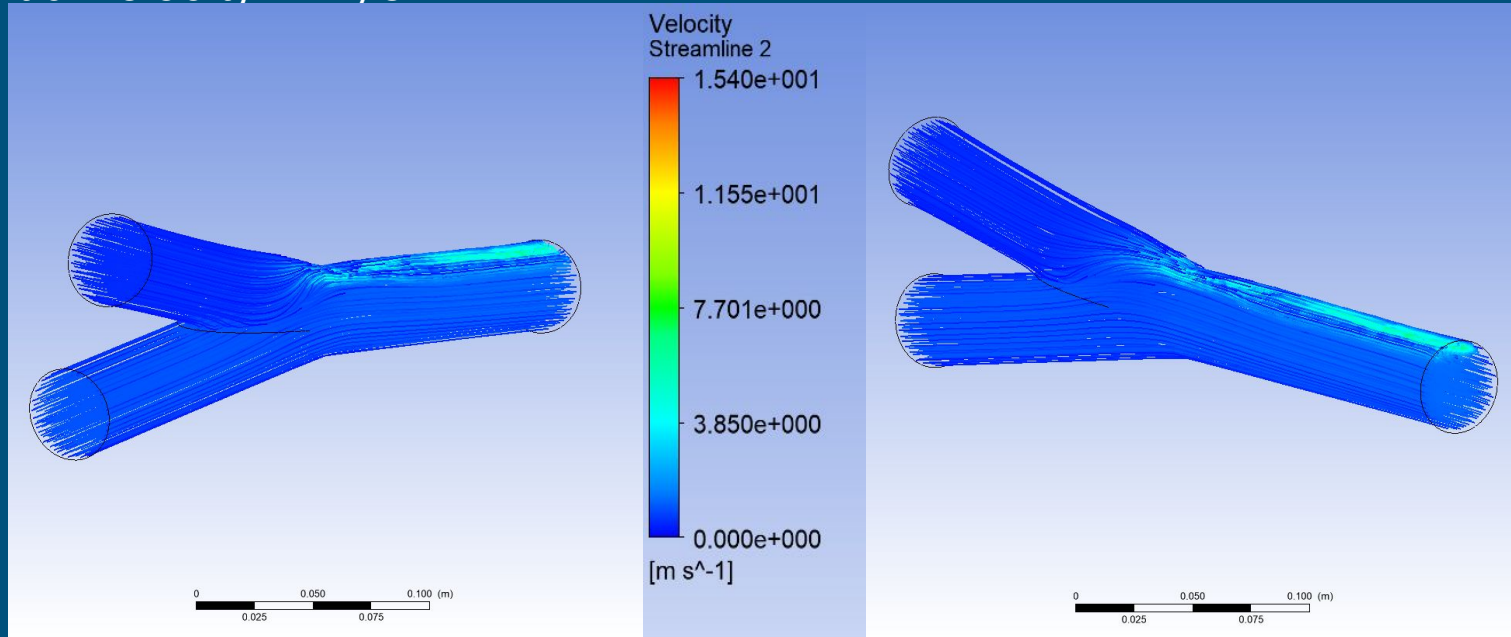


Phase Distribution - Trial 2

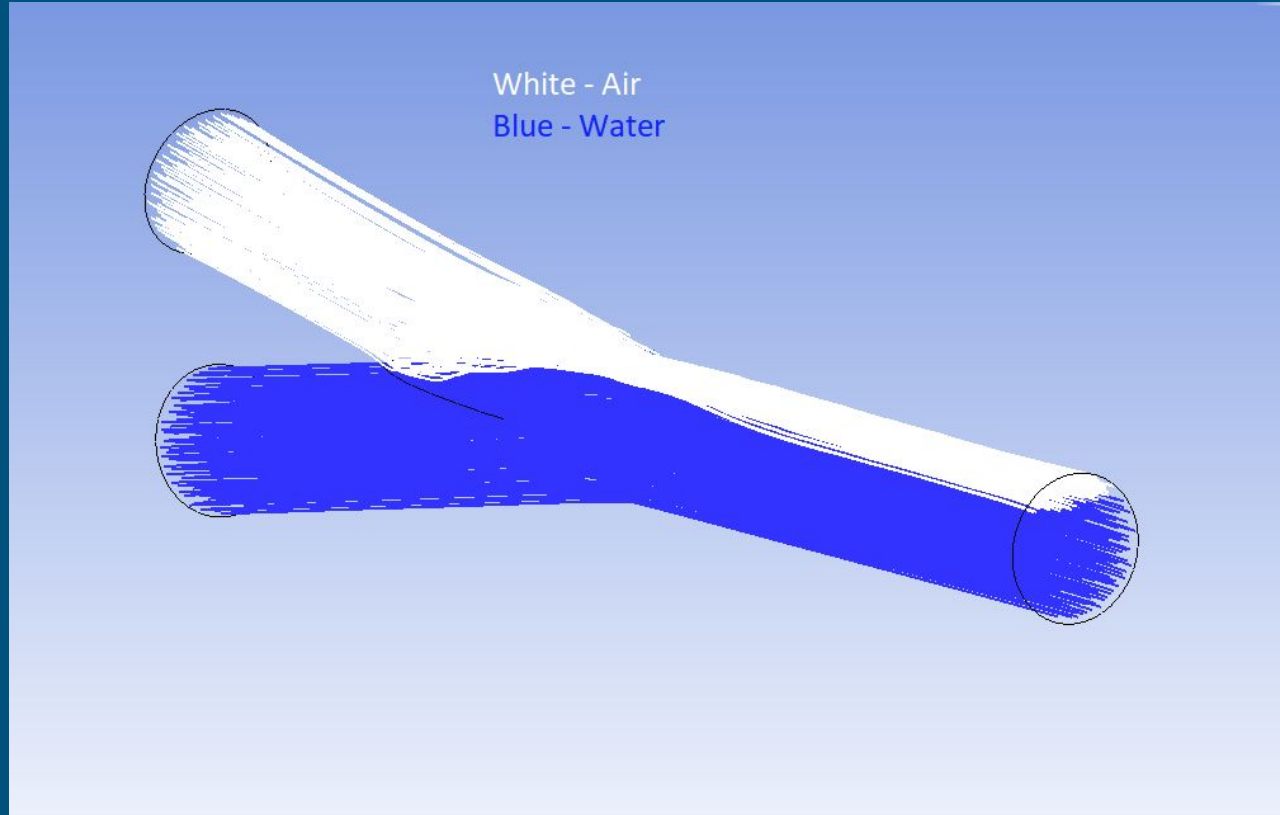


Trial 3: Higher Velocity Water

- Air initial velocity: 0.5 m/s
- Water initial velocity: 1 m/s



Phase Distribution - Trial 3



Deductions

- Phase distributions of water and air form a wave-like pattern
 - Similar to real life waves
- Percentage of area at outlet of air increases with increasing velocity of air
- Increasing size of pipe increases maximum velocity of the fluid flow

Next Steps

- Try experimenting with different shapes
 - Ex: Angles between pipes



Questions?