Fun with ADTs!!!

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The Quest(?)

- **Implement a** ComplexNumber class
- **Represents number** \( a + bi \)
- **Possible representations:**

\[
(x, y) \quad \text{Cartesian coordinates}
\]

\[
(a, b) \quad \text{(theta, r)} \quad \text{Polar coordinates}
\]
Write specs

- What operations should ComplexNumber have?
  - Creators/producers
  - Mutators
  - Observers
Write specs

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  - Mutators
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- [http://www.cs.washington.edu/education/courses/cse331/12wi/section/ComplexNumber/ComplexNumber.html](http://www.cs.washington.edu/education/courses/cse331/12wi/section/ComplexNumber/ComplexNumber.html)
Implementation #1: Cartesian

- \((x,y)\) coordinates
  - \(x + yi\)
- What is the AF?
- What is the RI?
Implementation #1: Cartesian

- $(x,y)$ coordinates
  - $x + y\i$
- What is the AF?
- What is the RI?
  - RI is true – object cannot be in an invalid state!

http://www.cs.washington.edu/education/courses/cse331/12wi/section/ComplexNumber/v1/ComplexNumber.java
Implementation #2: Polar

- \((\text{theta}, r)\)
  - \(a: \text{rad} \times \cos(\text{theta})\)
  - \(b: \text{rad} \times \sin(\text{theta})\)

- What is the AF?
- What is the RI?
- What should go in \text{checkRep}()?
Implementation #2: Polar

- \((\theta, r)\)
  - \(a: \text{rad} \times \cos(\theta)\)
  - \(b: \text{rad} \times \sin(\theta)\)

- What is the AF?
- What is the RI?
- What should go in checkRep()?

- [http://www.cs.washington.edu/education/courses/cse331/12wi/section/ComplexNumber/v2/ComplexNumber.java](http://www.cs.washington.edu/education/courses/cse331/12wi/section/ComplexNumber/v2/ComplexNumber.java)