C++ Programming
Relationships & Multiplicity

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Teaching, Training and Coaching since more than a decade!

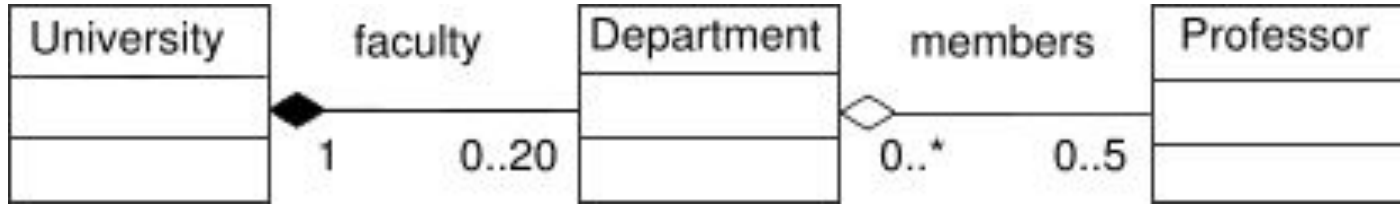*Artificial Intelligence & Computer Vision Researcher*
PhD from Simon Fraser University - Canada
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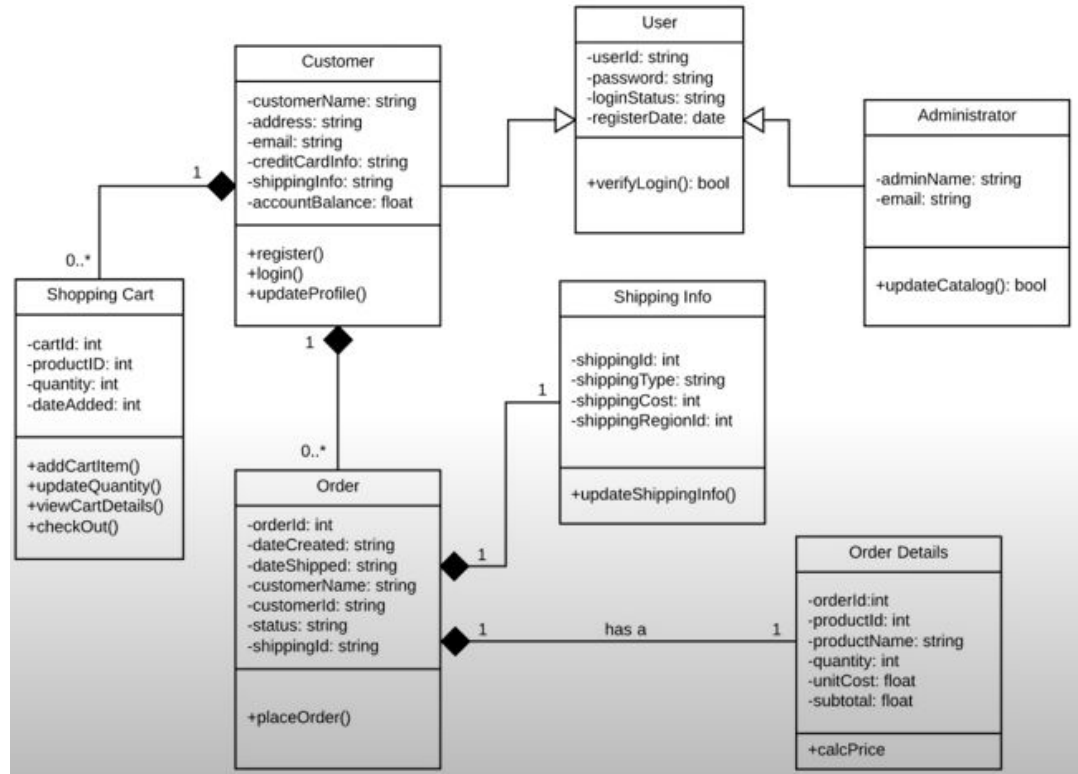Ex-(Software Engineer / ICPC World Finalist)

Multiplicity: University Example

- Notice the diagram **consistency** between relationships and multiplicity
- University is composed of a department
  - This means a department must belong to a single whole
  - Multiplicity must be exactly 1
- Department is aggregated of professors
  - This means some professor may not belong to a department
  - Multiplicity must be at least zero
- Tip: Put 1 beside black diamond and at least zero at the empty diamond. Check logic

Relationships & Multiplicity: Shopping Cart Example

Img Src

Think about relationships & multiplicity

- Student, Course
  - Student **registers** in course: Many-to-Many Relationship
    - Student **register**s in many courses. Course is **attend**ed by many students
- Customer, Bank Account, Saving Account, Checking Account
- Vehicle, Car, Seat, Engine, Door, Driver, Passenger, Gasoline, Garage
- Google Forms, Question, Answer, Options
- Computer, CPU, motherboard, Cache, Memory,
- Person, Student, Professor
- Patient, Patient Record
- Food Order, line items
- Project, Project Manager

"Acquire knowledge and impart it to the people."

"Seek knowledge from the Cradle to the Grave."