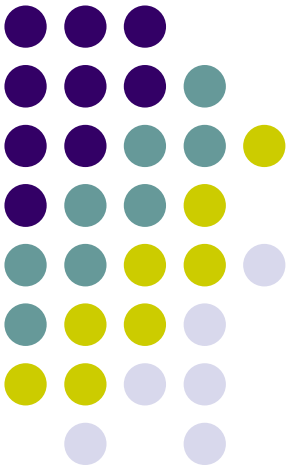
ME451
Kinematics and Dynamics of Machine Systems

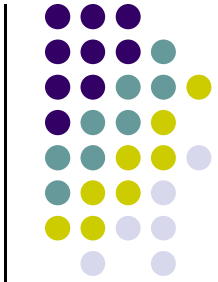
Wrecker-Boom Example

October 18, 2011



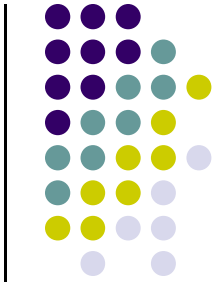
"As network administrator I can take down the network with one keystroke. It's just like being a doctor but without getting gooky stuff on my paws."
~Scott Adams ("Dogbert")

Before we get started…



- Last Time
  - Short lecture, discussed excavator example
- Today:
  - Wrecker-boom example – position, velocity, and acceleration analysis
- Next time
  - Learn how to visualize the results of your kinematics analysis
- Assignment due on Th, Oct. 20:
  - Textbook: 3.4.7, 3.4.8, 3.4.9
  - ADAMS & MATLAB emailed to you

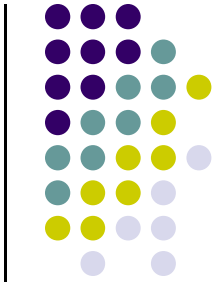
Before getting started…



- Midterm exam coming up on November 3
  - Closed books
  - You can write down on two sheets of paper (both sides) whatever you find useful
  - Save those two sheets of paper, you'll bring them along for the final exam as well
  - Review on Nov 2 at 6 PM in 1152ME

- What's left before the exam?
  - Newton method to solve at each time grid-point the constraint equations
  - Discuss about the velocity analysis and acceleration analysis
  - Putting it all together and getting your simEngine2D working

WRECKER-BOOM EXAMPLE



- We are interested in the KINEMATICS of this mechanism
  - That is, we are interested in how this mechanism moves in response to a set of *two* kinematic drives (motions) applied to it
  - Relatively straight forward to check that this mechanism has NDOF=0

- Recall what we have to do:
  - **Step A**: Identify *all* physical *joints* and *drivers* present in the system
  - **Step B**: Identify the corresponding set of constraint equations $\Phi(\mathbf{q},t)=0$
  - **Step C**: Compute $\Phi_{\mathbf{q}}$: needed for the Position Analysis
  - **Step D**: Compute ν : needed for the Velocity Analysis
  - **Step E**: Compute γ : needed for the Accelerations Analysis