CRC Cards

• A tool and method for systems analysis and design.
• Part of the Object-Oriented development paradigm.
• Highly interactive and human-intensive.
• Final result: definition of classes and their relationships.

• What rather than How.

• Benefits:
  
  Cheap and quick: all you need is index cards.
  Simple, easy methodology.
  Forces you to be concise and clear.
  Input from every team member.
What is a CRC Card?

**CRC** stands for **Class**, **Responsibility** and **Collaboration**.

- **Class**
  - An object-oriented class name.
  - Include information about super- and sub-classes.

- **Responsibility**
  - What information this class stores
  - What this class does
  - The behaviour for which an object is accountable.

- **Collaboration**
  - Relationship to other classes.
  - Which other classes this class uses
### What does a CRC Card Look Like?

<table>
<thead>
<tr>
<th>Class</th>
<th>Responsibilities</th>
<th>Collaborations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>Student number</td>
<td>Seminar</td>
</tr>
<tr>
<td></td>
<td>Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Address</td>
<td></td>
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<tr>
<td></td>
<td>Phone number</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enrol in seminar</td>
<td></td>
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<tr>
<td></td>
<td>Drop a seminar</td>
<td></td>
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<tr>
<td></td>
<td>Request transcript</td>
<td></td>
</tr>
</tbody>
</table>
A CRC Model is a collection of CRC cards.

It specifies the Object-Oriented Design (OOD) of the software system.
How To Create a CRC Model?

Typically, you are given a description (in English) of the requirements for a software system.

You work in a team.

Ideally, you all gather around a table.

You need a set of index cards and some pens.

Coffee / other beverages are optional.
How to Create a CRC Model?

Read the description. Again. And again.

Identify core **classes** (simplistic advice: look for nouns).

Create a card per class (begin with class names only).

Add **responsibilities** (simplistic advice: look for verbs).

Which other classes does this class need to talk to to fulfil its responsibilities? Add **collaborators**.

Add more classes as you discover them.

Put classes away if they become unnecessary. (But don’t tear them up yet!)

Refine by identifying abstract classes, inheritance, etc.

Keep adding/refining until everyone on the team is satisfied.
How Can We Tell It Works?

A neat technique: a **Scenario Walk-through**.

Select a scenario and choose a plausible set of inputs for it.

Manually “execute” each scenario.

- Start with initial input for scenario and find a class that has responsibility for responding to that input.
- Trace through the collaborations of each class that participates in satisfying that responsibility.
- Make adjustments as necessary.
- Repeat until scenario has “stabilized” (that is, no further adjustments are necessary).