15-410

How to Ask Questions
Aug. 31, 2018

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Motivation

You're here to learn
You ask us questions
Some questions result in better learning than others
  - We have a pedagogical theory
    - We would like to train you to be self-oracular

Topic: how to ask the faster-learning questions
Outline

I don't get _____.
Can I assume __________?
Is this the right way to ________?
I can't decide between ______ and _______.

Q1: “I don't get ______”

What you ask us
  - I don't get ______

The problem we fear
  - Insufficient synthesis
Q1: “I don't get ______”

What you ask us
- I don't get ______

The problem we fear
- Insufficient synthesis
  - Textbook
  - “Regular” (inter-project) lectures
  - Project-specific lecture
  - Project specification, project handout
  - Test code (reading during design can be good)
  - Material on “projects” web page of course web site
Q1: “I don't get ______”

What you ask us

- I don't get ______

The problem we fear

- Insufficient synthesis
  - Textbook
  - “Regular” (inter-project) lectures
  - Project-specific lecture
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How to help us with our fears

- “I read X and Y. I think I understand Z, but I don't see how to apply W.”
- “When the spec says ____, I can't tell whether that means ____ or ____ because ____.”
Q2: Can I assume __________?

What you ask us
- Can I assume _____?

The problem we fear
- Missed opportunity for design
Q2: Can I assume __________?

What you ask us
- Can I assume _____?

The problem we fear
- Missed opportunity for design

How to help us with our fears
- Ask yourself these two questions instead
  - Q2': If I assume _____ and I'm wrong, what will happen?
  - Q2'': If I don't assume _____, what is the penalty?
Q2: Can I assume _________?

What you ask us
  - Can I assume _____?

The problem we fear
  - Missed opportunity for design

How to help us with our fears
  - Ask *yourself* these two questions instead
    - Q2': If I assume _____ and *I’m wrong*, what will happen?
      » A1: “The world will end” ⇒ ...?
      » A2: “Maybe I must complain to user” ⇒ ...?
Q2: Can I assume __________? 

What you ask us
- Can I assume _____?

The problem we fear
- Missed opportunity for design

How to help us with our fears
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Q2: Can I assume ___________?

What you ask us

- Can I assume _____?

The problem we fear

- Missed opportunity for design

How to help us with our fears

- Ask *yourself* these two questions instead
  - Q2': If I assume _____ *and I'm wrong*, what will happen?
    - A1: “The world will end” ⇒ maybe not assume
    - A2: “Maybe I must complain to user” ⇒ ok?
  - Q2'': If I *don't* assume _____, what is the penalty?
    - A1: “Must do 1 more XOR” ⇒ ...
    - A2: “Must do O(N^{12}) graph scan” ⇒ ...
Q2: Can I assume ________?

What you ask us
- Can I assume _____?

The problem we fear
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    - A2: “Must do O(N^{12}) graph scan” ⇒ ok to assume?
- Avoid: “World will end” + “save 1 XOR”
Q3: Is this the right way to _____?

What you ask us

- Is this the right way to _____?

The problem we fear

- You believe there is one right way to _____.
Q3: Is this the right way to _____?

**What you ask us**
- Is this the right way to _____?

**The problem we fear**
- You believe there is *one* right way to _____.
  - Usually, there are several
  - Generally our assignments are designed to have multiple good solutions
Q3: Is this the right way to _____?

What you ask us

- Is this the right way to _____?

The problem we fear

- You believe there is one right way to _____.
  - Usually, there are several
  - Generally our assignments are designed to have multiple good solutions

How to help us with our fears

- Figure out two or three ways to _____
  - Often one will seem clearly better than the other(s)
  - Regardless, you will almost certainly understand the problem better
  - But sometimes you may end up having to make a tough decision...
Q4: I can't decide between X & Y

What you ask us
- I can't decide between X and Y

The problem we fear
- You believe that we believe X (or Y) is “the right answer”
  - Again, we try not to do this
- Missed opportunity for design
Q4: I can't decide between X & Y

What you ask us
- I can't decide between X and Y

The problem we fear
- You believe that we believe X (or Y) is “the right answer”
  - Again, we try *not* to do this
  - Missed opportunity for design

How to help us with our fears
- Show us a table!
Q4: I can't decide between X & Y

<table>
<thead>
<tr>
<th>Metric 1</th>
<th>Proposal X</th>
<th>Proposal Y</th>
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<tbody>
<tr>
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<td>Bad</td>
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<table>
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<th>Metric 2</th>
<th>Proposal X</th>
<th>Proposal Y</th>
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</thead>
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Conclusion: This one, because...
Q4: I can't decide between X & Y

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Note!
- This table is strictly better than “a list of pros and cons”
Conclusion

Suggestions

- Make sure you read everything
- Ask detailed questions that refer to handout, spec, etc.
- Ask multi-dimensional questions about assumptions
- Try to find multiple solutions to a tough problem
  - When choosing, try to have a rationale
  - If you write down a summary each time, you have a “design document”!