Introduction
Requirements Engineering: Getting Started

- Why RE?
- What is RE?
- How to do RE?

Once upon a time...

Go Away!
Rain, Rain, stop the snowing!

Can you really want?
Dear Architect,

Please design and build me a house. I am not sure of what I need, so you should use your discretion.

My house should have between two and forty-five bedrooms. Just make sure the plans are such that the bedrooms can be easily added or deleted.

When you bring the blueprints to me, I will make the final decision of what I want. Please design and build me a house. I am not sure of what I need, so you should use your discretion.

Please take care that modern design practices and the latest materials are used in construction of the house. As I want it to be a showplace for the most up-to-date ideas and methods, please consider the latest kitchen should be equipped to accommodate, among other things, my 1952 Gibson refrigerator.

Also, bring me the cost breakdown for each configuration so that I can arbitrarily pick one. When you bring the blueprints to me, I will make the final decision of what I want.

Keep in mind that the house I ultimately choose must cost less than the one I am currently living in. Make sure, however, that you correct all the deficiencies that exist in my current house (the floor of my kitchen vibrates when I walk, my dishwasher is not quiet, my windows are drafty, my roof leaks, etc.).

Also, keep in mind that I want to keep yearly maintenance costs as low as possible. This should mean the incorporation of extra-cost features like aluminum, vinyl, or composite siding. (If you choose not to specify aluminum, be prepared to explain your decision in detail.)

For example, if you choose not to specify aluminum, I will need enough insulation in them.

As you design, also keep in mind that I want to keep your design as simple as possible. I will take full advantage of modern technology, hence it is my desire to have the house as simple as possible.

When two trains approach each other at a crossing, both shall come to a full stop and neither shall start up again until the other is gone. Kansas legislature, early 1890's.

Trespassers will be prosecuted to the full extent of the law.

We will sell gasoline to anyone in a glass container.

Don't kill your wife.

Let our washing machine do the dirty work.

When it rains, the sky is blue.

Ice cream souvenirs on a billboard on I-24, Nashville.

We now have dress shirts on sale for men with 16 necks.

We will sell gasoline to anyone in a glass container.

Dinner Special - Turkey $2.35; Chicken or Beef $2.25; Children $2.00.

We will sell gasoline to anyone in a glass container.

Please wait for hostess to be seated in restaurants.

Don't kill your wife.

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If architects had to work like programmers

Getting Started

Lawrence Chung

Getting Started

If architects had to work like programmers

Please advise me as soon as possible if this is the case.

PS: Perhaps what I need is not a house at all, but a travel trailer.

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Getting Started

Another architect

P.S.: My wife has just told me that she disagrees with many of the instructions you have so far issued with your complete ideas and plans.

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Why RE?

Error Propagation in Lifecycle [Mizuno82]

- Re-engineering and Evolution
- Requirements Analysis
- Software Architecture and Design
- Testing
- Implementation
- Maintenance

How costly is it?

How big is the erroneous spec.?
Why RE?

How big is the "erroneous specification"?

- **Bell Labs and IBM studies**
  - 80% of all defects are inserted in the requirements phase.
  - Improving the requirements definition process reduces the amount of testing and rework required.
  - The above figures do not include the end user losses who have to live with poor software on a daily basis.

- **U.S. Air Force projects**
  - 36% of all defects were due to faulty requirements translation.
  - Only 9% of these errors were resolved (in the requirements phase).

- **Voyager and Galileo spacecraft**
  - Of the 197 significant software faults found during integration & system testing, only 3 of those errors were programming errors; the vast majority of the faults were requirements problems.

- **Application Specific Integrated Circuits (ASICs)**
  - 

- **U.K. Health and Safety Executive**
  - Only 9% of all defects were resolved (in the requirements phase).

- **U.S. Air Force Projects**
  - Only 9% of all defects were due to faulty requirements translation.

- **Defining the problem is the problem**

How costly are requirements errors?

- **Lindstrom93**
  - Get the requirements wrong, you'll destroy the project.

- **Boehm87**
  - COST (correcting design/implementation errors) = \(100 \times \text{COST (correcting requirements errors)}\)

- **Humphrey97**
  - A useful rule of thumb: It takes about 1 to 4 working hours to find and fix a bug in function or system test.

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Three most frequent problems plaguing large software systems:

- Changes after commissioning 20.6%
- Design and implementation 14.7%
- Specification 14.1%

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- Changing and conflicting requirements
- Thin spread of domain application knowledge

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Why RE?

Productivity follows quality. Productivity was the wrong issue. Most poor productivity is due to long testing, fixing. It gets the quality up in the original build, testing goes fast and overall productivity goes up.

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