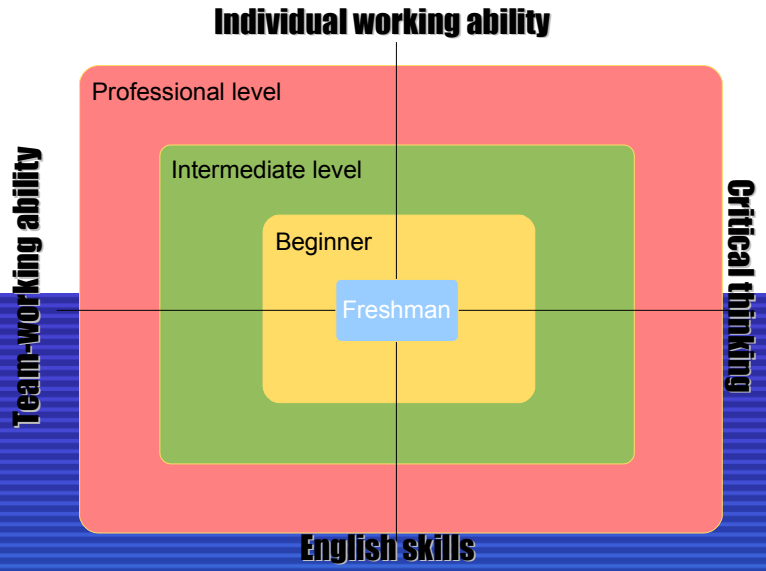
Basic Training

Essential Competences
As Design Engineers
- Beginner level -



Renesas Design Vietnam Co., Ltd.

Software Engineering Division
Hung Pham

March 6, 2016

Course outline

Mar 09 AM:	Self-expectation / course objectives. Investigation methodology. Schedule your works. Critical thinking, 5-why analysis. Homeworks.
Mar 09 PM:	Do your homeworks.
Mar 16 AM:	Present your homeworks. Discussion on your reports.
Mar 16 PM:	Communication at works. How to make solutions. Business ethics. Define your career path.

Agenda - Mar 09 AM

08:30 ~ 09:00	Objectives, self-expectations
09:00 ~ 09:45	Investigation methodology (individual working ability)
09:45 ~ 10:00	Break
10:00 ~ 10:30	Schedule your works (individual working ability)
10:30 ~ 11:15	Critical thinking and 5-why analysis (individual working ability)
11:15 ~ 11:30	Grouping and homeworks.

Objectives

Start-up

Introduce yourselves
and your expectations for your engineering skills (exclude technical skills).

Take notes your expectations to make Q&A
until you're clear how to achieve your expectations.

Objective of this presentation

To give new engineers an understanding of *some essential competences* (basic level) which latter be used in engineering context as an aid to accomplish *engineering targets* and *company objectives*.

The material just provides theory.

Students are recommended to ask questions to instructors to acquire real experiences.

The company objectives

Renesas Design Vietnam Co., Ltd. will

- Provide *the best quality design technology* and *innovative design methodology* for system solution business in semiconductor field.
- Contribute to activity of global design center in Renesas Group.

Accuracy

Assertion

RVC 's missions are

- HW/SW design of SoC / MCU
- Core competence of Renesas
- Customer satisfaction

Quality

Ambition

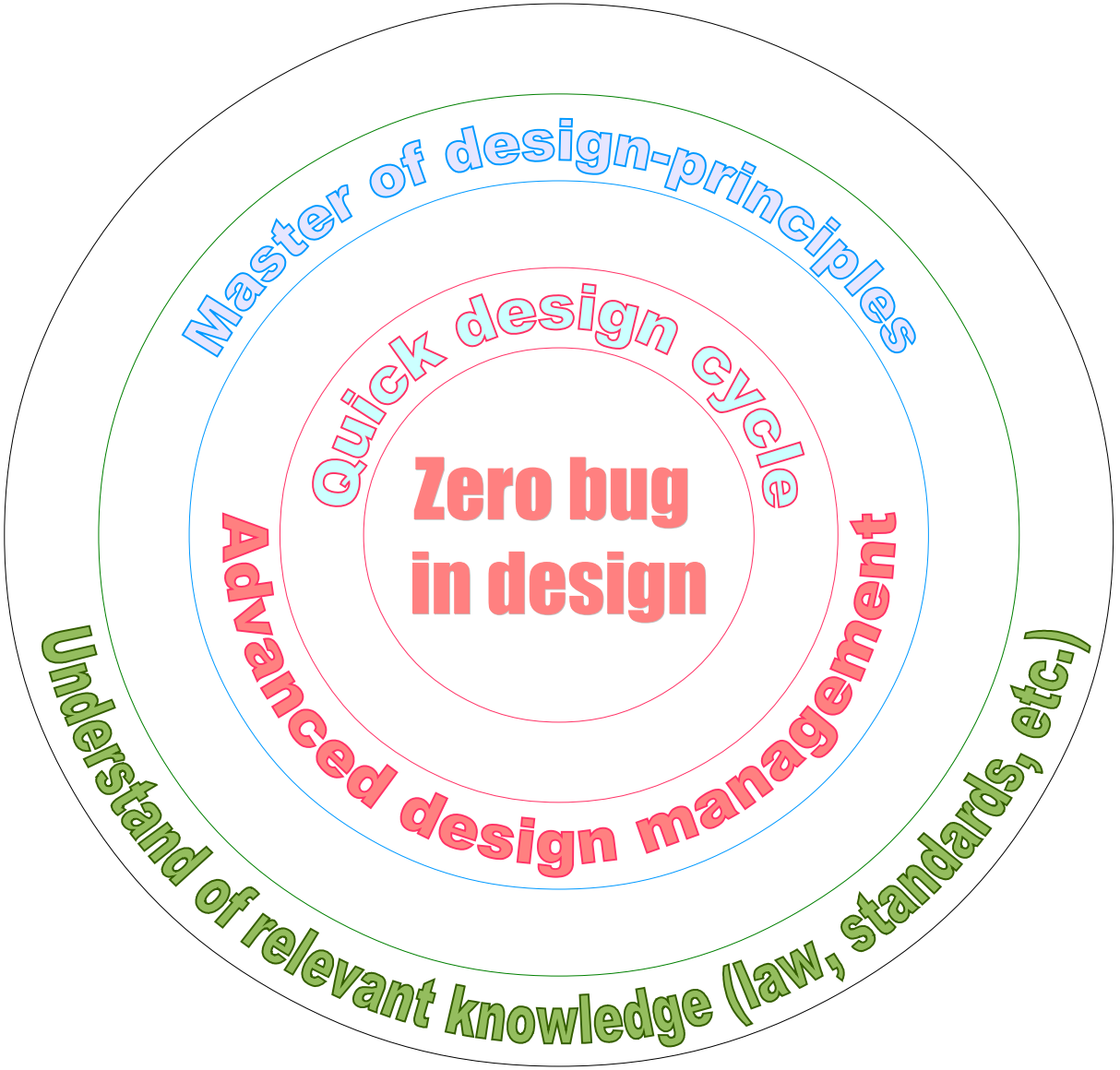
Innovation

Attention

Fairness

Compliance

The engineering targets

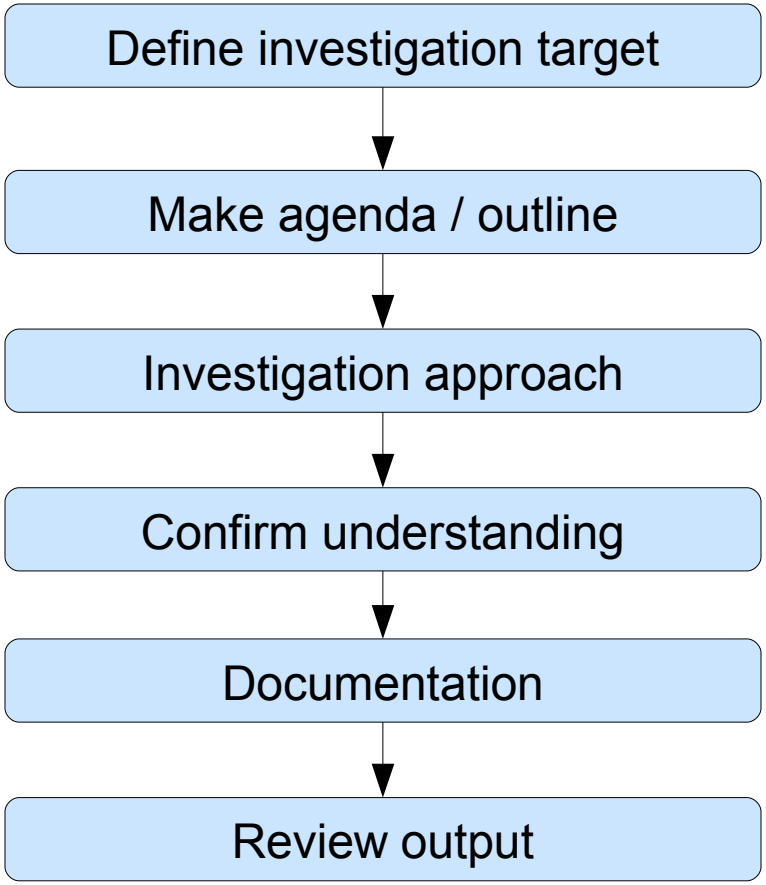


Investigation methodology

Investigation process

How have you been investigating new knowledge ?
What is your main difficulty ?
(2 ideas)

Investigation process



Define investigation target

Make agenda / outline

Investigation approach

Confirm understanding

Documentation

Review output

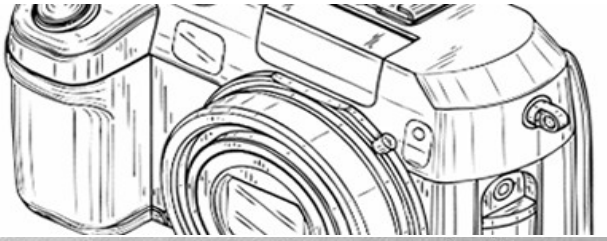
How to finish investigation within limited time?

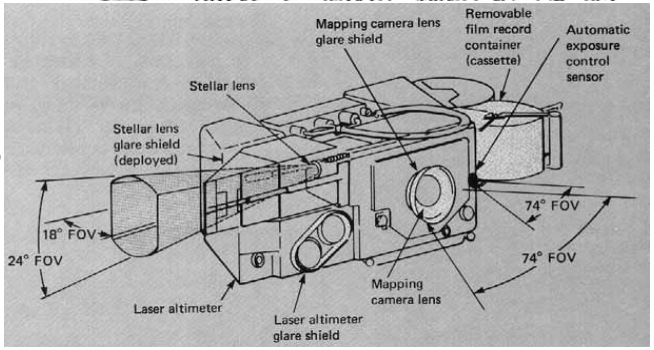
Verification purpose:

- What is its functionality?
- How to use it?

Development purpose:

- Internal structure?
- How many components?
- Relationship among components?





If you have any trouble to know what target for you to investigate, please discuss directly with leader or whom assign you the task.

How to keep direction of investigation?

- Define investigation target
- Make agenda / outline
- Investigation approach
- Confirm understanding
- Documentation
- Review output

What will I investigate & what will I write?

List-up input/reference material for each item

Example:

1. Introduction
2. System architecture
3. System characteristics
4. Components intro
5. Components interface
6. Components communication
7. Detail processing of each component
8. Other resources

Then, collect input specifications and concentrate on the above agendas in those specifications.

Define investigation target

Make agenda / outline

Investigation approach

Confirm understanding

Documentation

Review output

How should I limit level of investigation?

- Widely first: Try to find basic information on your target

Example:

+ What's Analog-to-Digital Converter?

+ How to do this conversion?

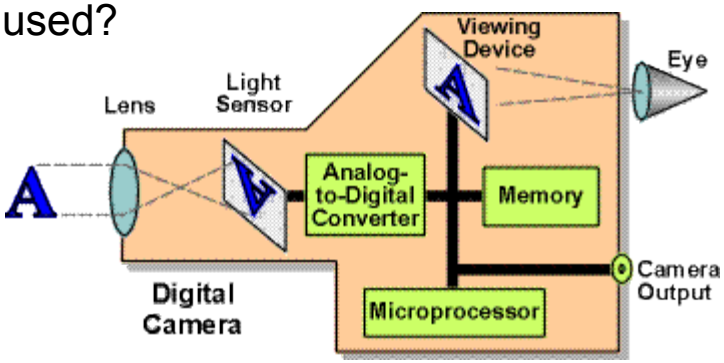
+ Where is this component in processing flow?

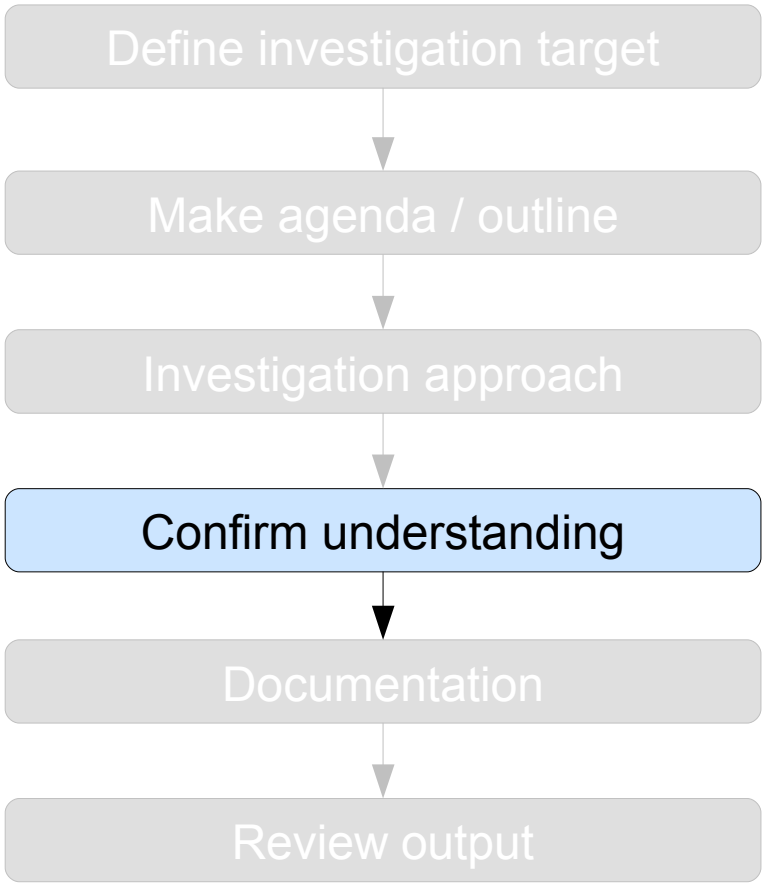
- Deeply later: For each item, please ask why? for what?

Example:

+ Why do we need to convert from Analog to Digital?

+ For what, “Digital” is used?





How should I know whether is it right or wrong?

Please ask, whenever completing investigation of one item or you have an unclear point.

Q&A style 1:

What is operation of A?

Q&A style 2 (recommended):

In “doc ...” page ... the description is that: A does like B

But in “doc ...” page ... it said that: A might do like C

My understanding: in normal operation, A works like B.

But, in abnormal case, A may work like C. Is this correct?

It shows that you did investigation before asking

Please don't trust all existed doc / spec is perfect

Define investigation target

Make agenda / outline

Investigation approach

Confirm understanding

Documentation

Review output

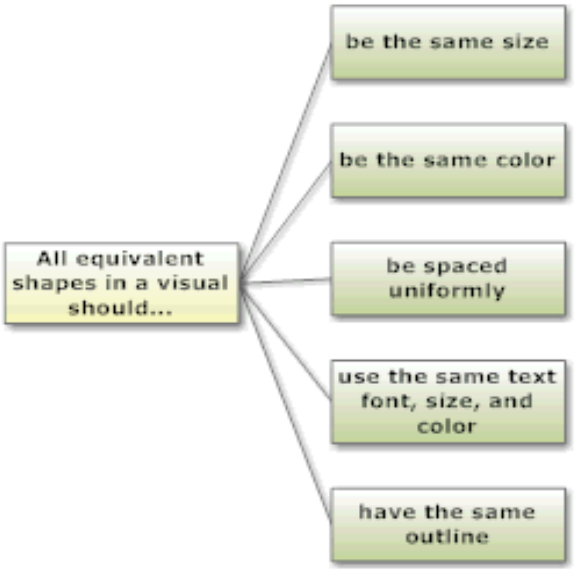
How to create good document?

- Please always give definition for not common terms because your reader is not only current colleague but also next newcomer

- Please keep consistency in your document:

  + Keep same view point will help to reduce misunderstanding

  + From experience, person who create a consistent document will make less defects in design/source code



Define investigation target

Make agenda / outline

Investigation approach

Confirm understanding

Documentation

Review output

Do I need to review created document by myself?

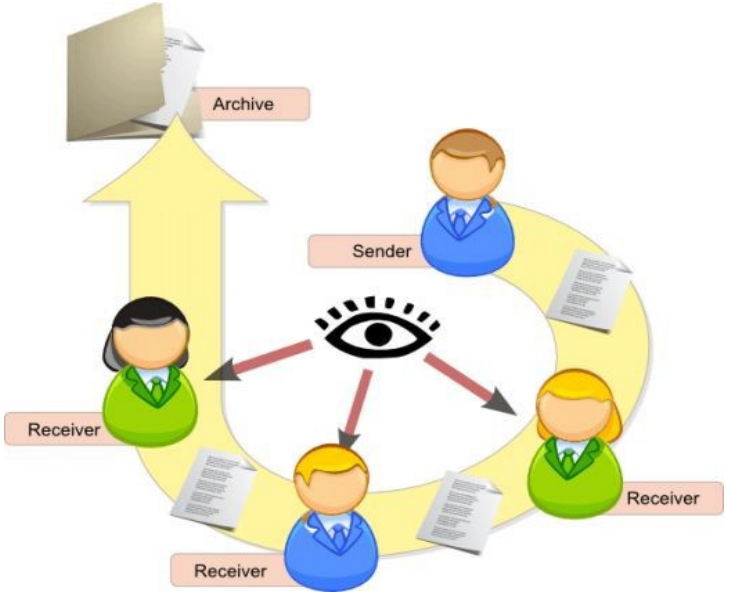
YES, ALWAYS

Re-read your document after completing one part to:

- detect simple mistakes (format, unification, typo)

- re-think about the idea (any other solutions?)

- check under reader point of view whether there is unclear description or inconsistent description.



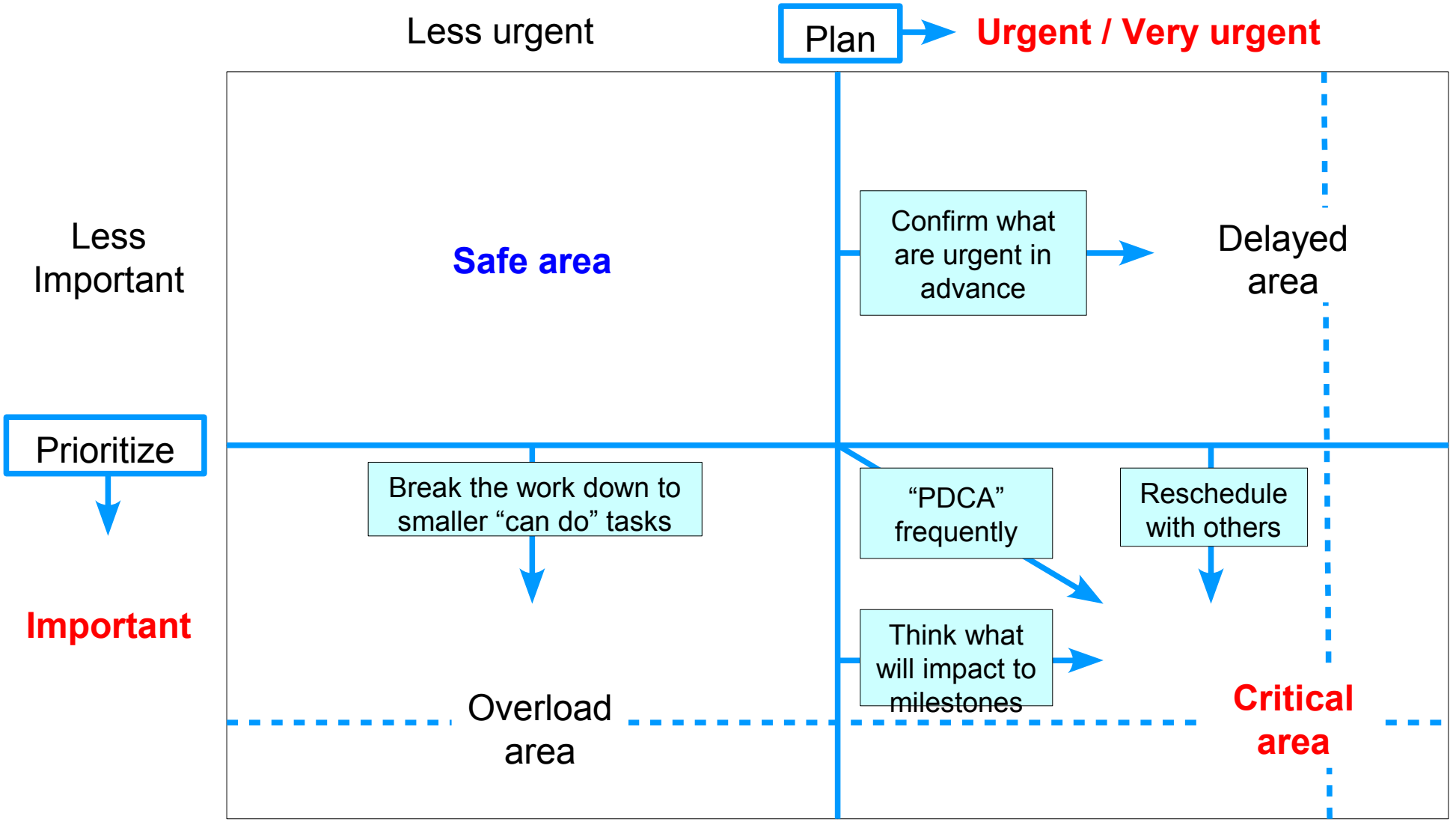
Break (15 minutes)

Schedule your works

Start-up

How have you been scheduling your works ?
(2 ideas)

The “schedule” window



Schedule your works

- How to:
  - Break down final targets into various smaller targets.
  - Define SMART targets.
  - Report progress based on quantitative data and clear comments.

- SMART targets: *Practice to define your task's taget.*

PDCA cycle: to improve our work scheduling

PDCA is a continuous improvement tool.

Plan

Investigate
Clarify objectives
Identify possible causes
Benchmark best practice
Identify team roles
Implement quick fix

Do

Implement
Carry out trial to prove causes
Analyze data to understand how problem occurs
Identify possible solutions

Check

Evaluate & Validate
Pilot study solution to verity data
Countermeasure
Training
Communication

Act

Correct & Standardize
Review feedbacks & Make corrections
Standardize Do, Check, Act

Customer satisfaction

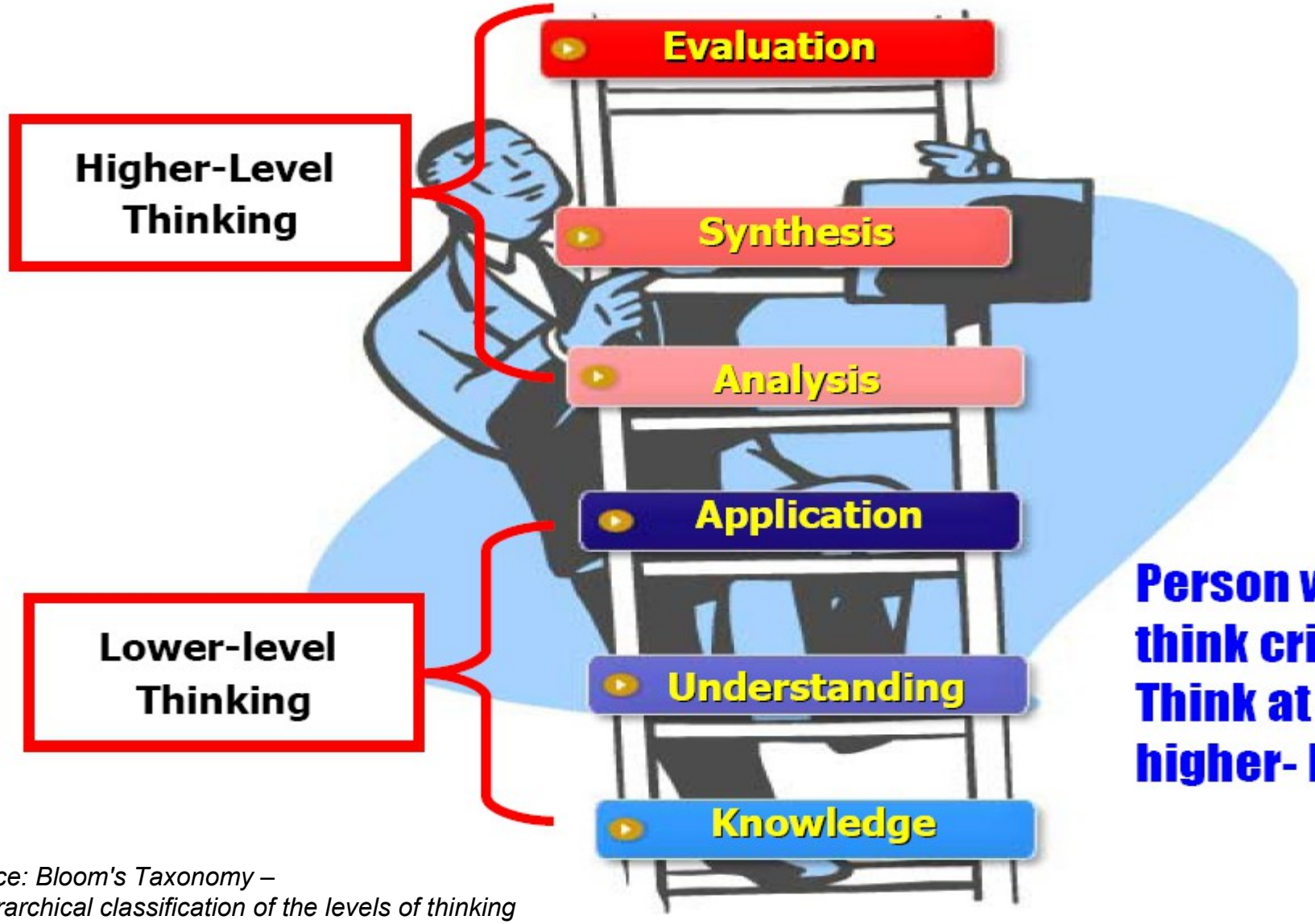
(Source: NSK-RHP/S D Bellamy)

Home-work #1

1. Discuss internally to propose a simple template to schedule & control your works. (by E/Mar 09)
2. Schedule your works in the period Mar 09 – Mar 15 and update status daily.
3. Send it to your supporters and me to report progress & time management <hung.pham.xm@rvc.renesas.com>

Critical thinking

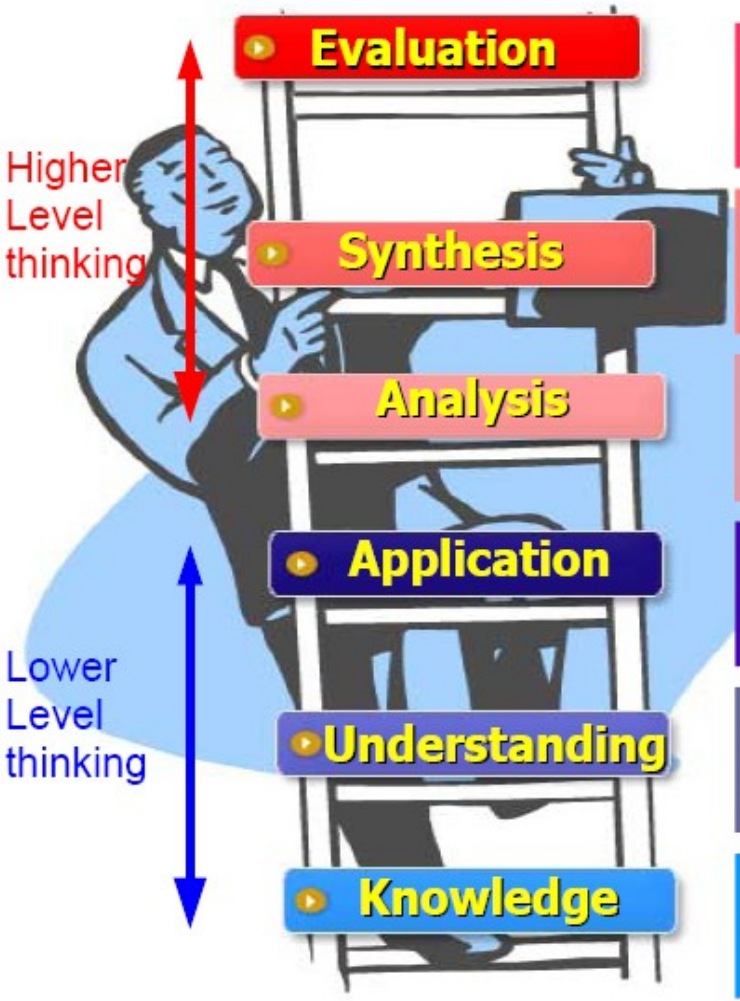
Critical thinking



Person who think critically: Think at higher- level

Source: Bloom's Taxonomy –
a hierarchical classification of the levels of thinking

Critical thinking



Evaluation	Make judgments and decisions by determining the reliability of things.
Synthesis	Combine ideas and come to a conclusion
Analysis	Break the entire process into parts, understand the relation of these parts to the whole
Application	Take knowledge learnt in one situation and apply to another situation
Understanding	Seek to select and organize facts and ideas, discovering the relationships between them.
Knowledge	Seek to determine the basic information of a situation

Source: Bloom's Taxonomy –
a hierarchical classification of the levels of thinking

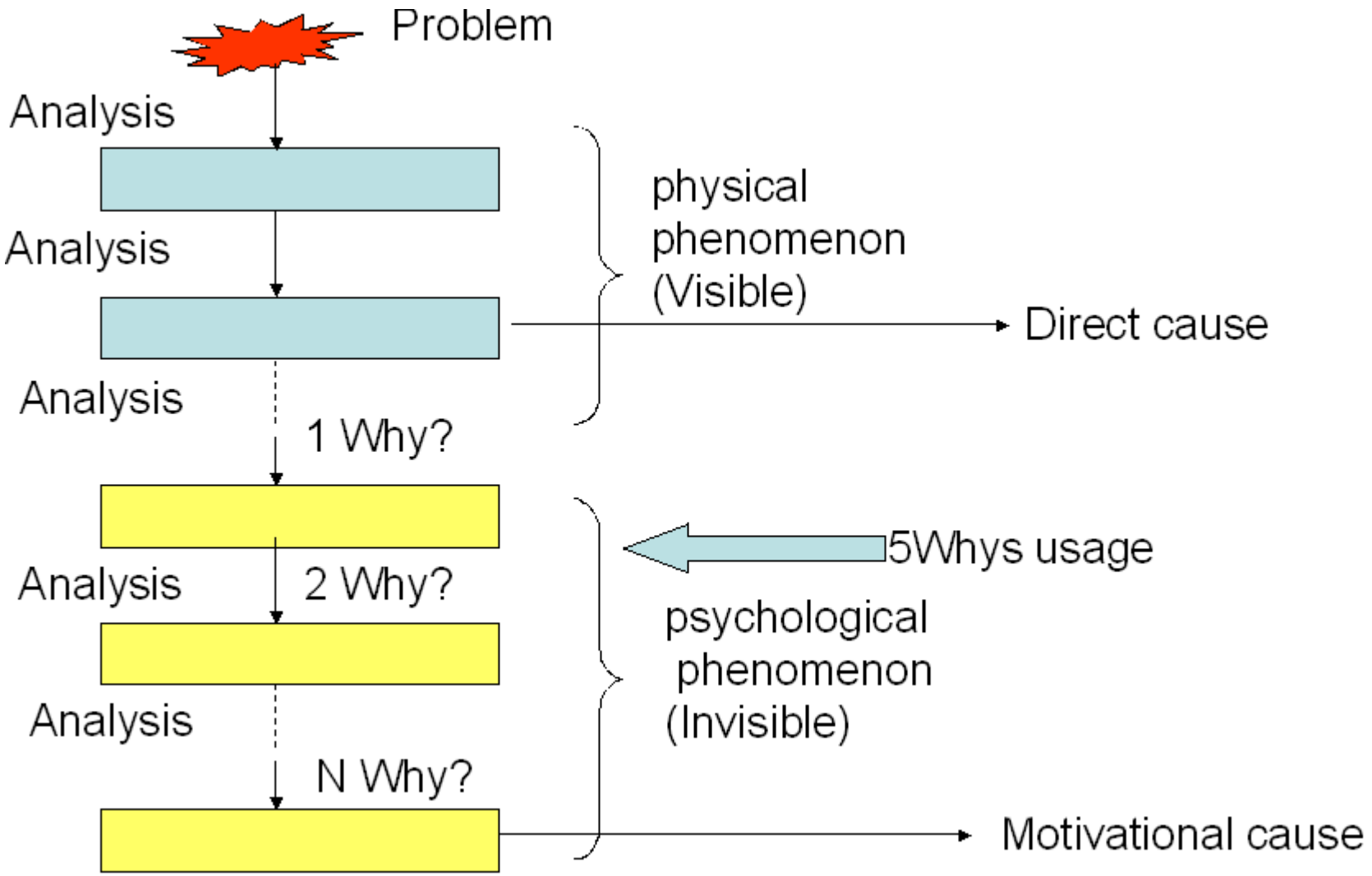
Critical thinking

Critical thinking in solving engineering problem is a chain of following activities:

- Detect the problem
  - Solve the problem
    - Forecast the future
      - Prevent similar problem in future

5why analysis

Critical thinking tool - 5why analysis



Critical thinking tool – Actual experiences

Enclosed file
“RVC_Local_Comment_5Why_Analysis.pdf”

Home-work #2

Divide 5 groups and select 1 leader/group

- Leader sends "topic" registration by Mar 09

- Make 5why analysis presentation by Mar 16

On Mar 16 AM:

+ Presentation: 15 minutes

+ Q&A: 15 minutes

End of this morning.
Thank you for your cooperation.

Agenda - Mar 16 AM

08:30 ~ 09:00	5why analysis report (Group 1)
09:00 ~ 09:30	5why analysis report (Group 2)
09:30 ~ 10:00	5why analysis report (Group 3)
10:00 ~ 10:30	5why analysis report (Group 4)
10:30 ~ 11:00	5why analysis report (Group 5)
11:00 ~ 11:15	Break
11:15 ~ 11:45	Feedback from trainer

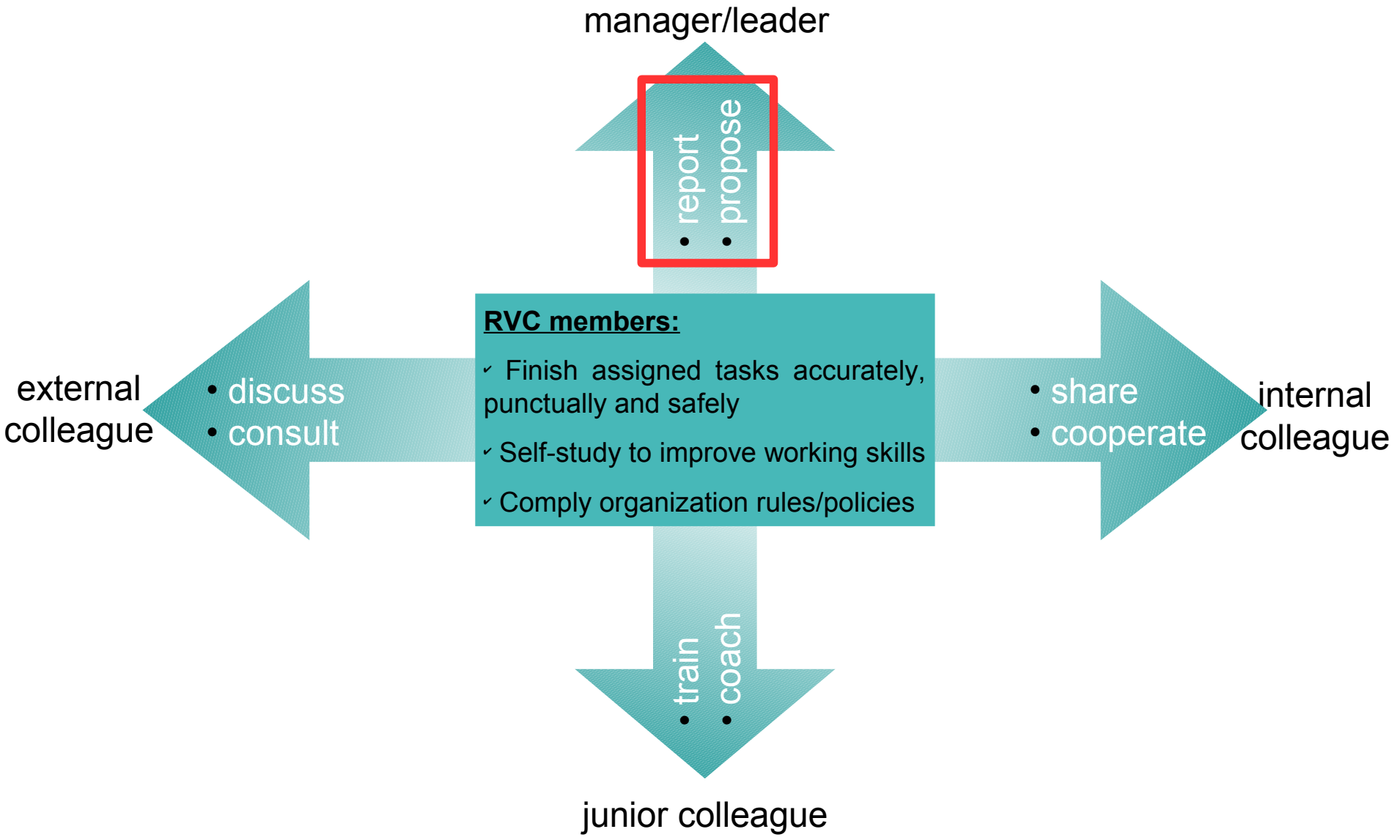
End of this morning.
Thank you.

Agenda - Mar 16 PM

13:15 ~ 13:45	Discuss how to make a good reports (team working ability)
13:45 ~ 14:45	Communication at work (team working ability)
14:45 ~ 15:00	Break
15:00 ~ 15:30	Making solutions (team working ability)
15:30 ~ 15:45	Business ethics
15:45 ~ 16:00	Define your career path

Making a report

RVC team-work



Reports – Your common problems

What are your common problems ?

Making a report

“ Writing weekly report is an activity to look back on one week and think what is good/bad, what is needed to improve if bad. ”

(Atsushi Hiraoka - RT/PFKaise)

Making a report

Ask yourselves ...

Why do you need to report ?

Who will read your reports ?

What are valuable in the reports ?

Issues when making a report

- **Unclear target recipients**
- **Unclear task assignment** (Output, Work-speed, Manpower, Duration)
- **Tend to keep schedules on-time** (focus only to progress/process)
- **Tend to report without comments** (lack of active thinking)
- **Too much waste infos, too few needful issues (achievements, problems together with proposed solutions)**
- **Passive reacts for report comments by others**
- **Issues are easily vanished without confirmations**
- **Big issues cause big impacts are usually reported lately**
- **Root causes are not pointed out**

Communication at work

Communication at work

Speaking / Listening

Difficulty ?

Review meeting

Common Mistakes ?

Issue-solving meeting

Efficiency of Meeting ?

Follow-up meeting

……

Find some hints in this material

Writing / Reading

Difficulty ?

Cross-check result

Common Mistakes ?

Issue-solving email

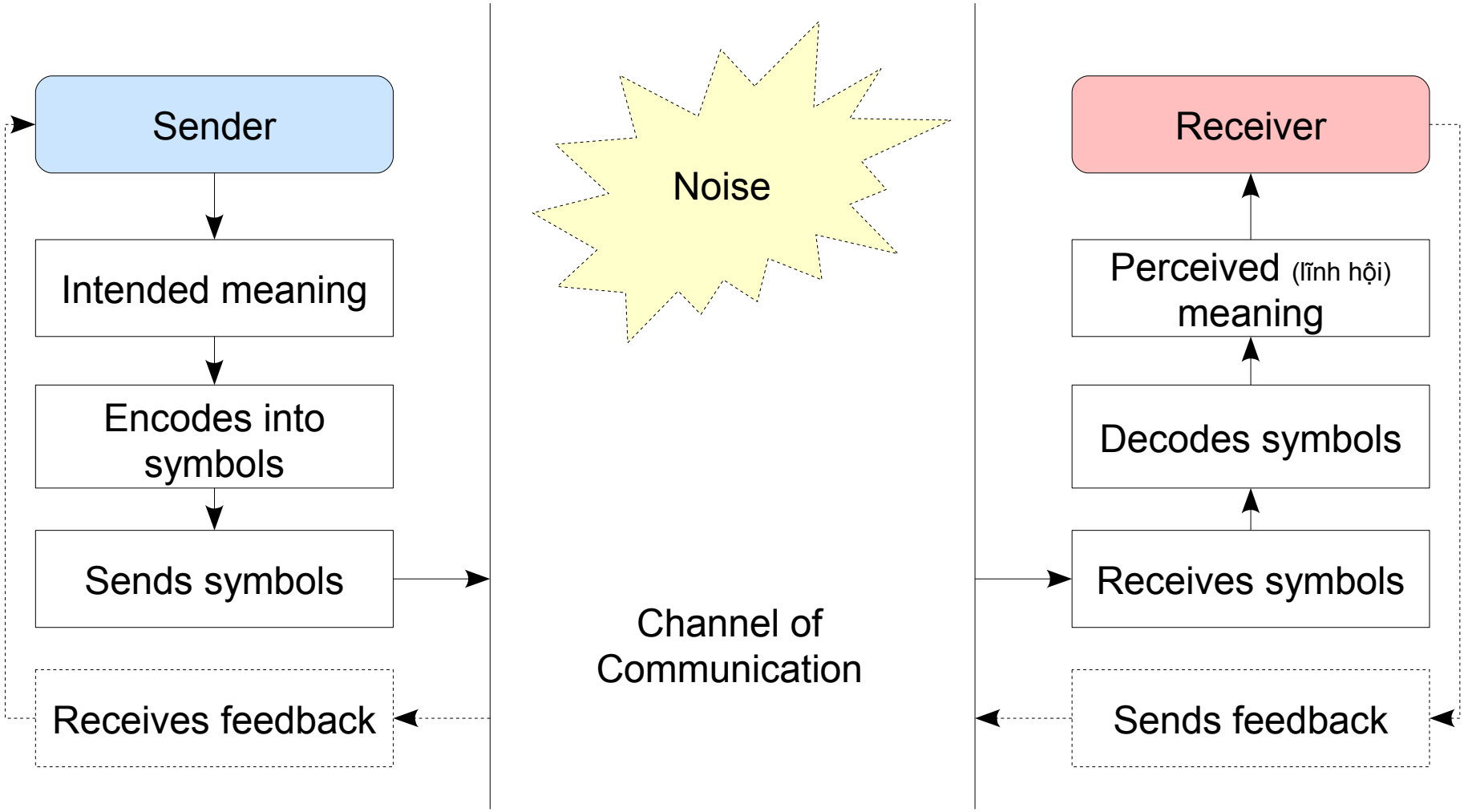
Efficiency of Meeting ?

Report email

……

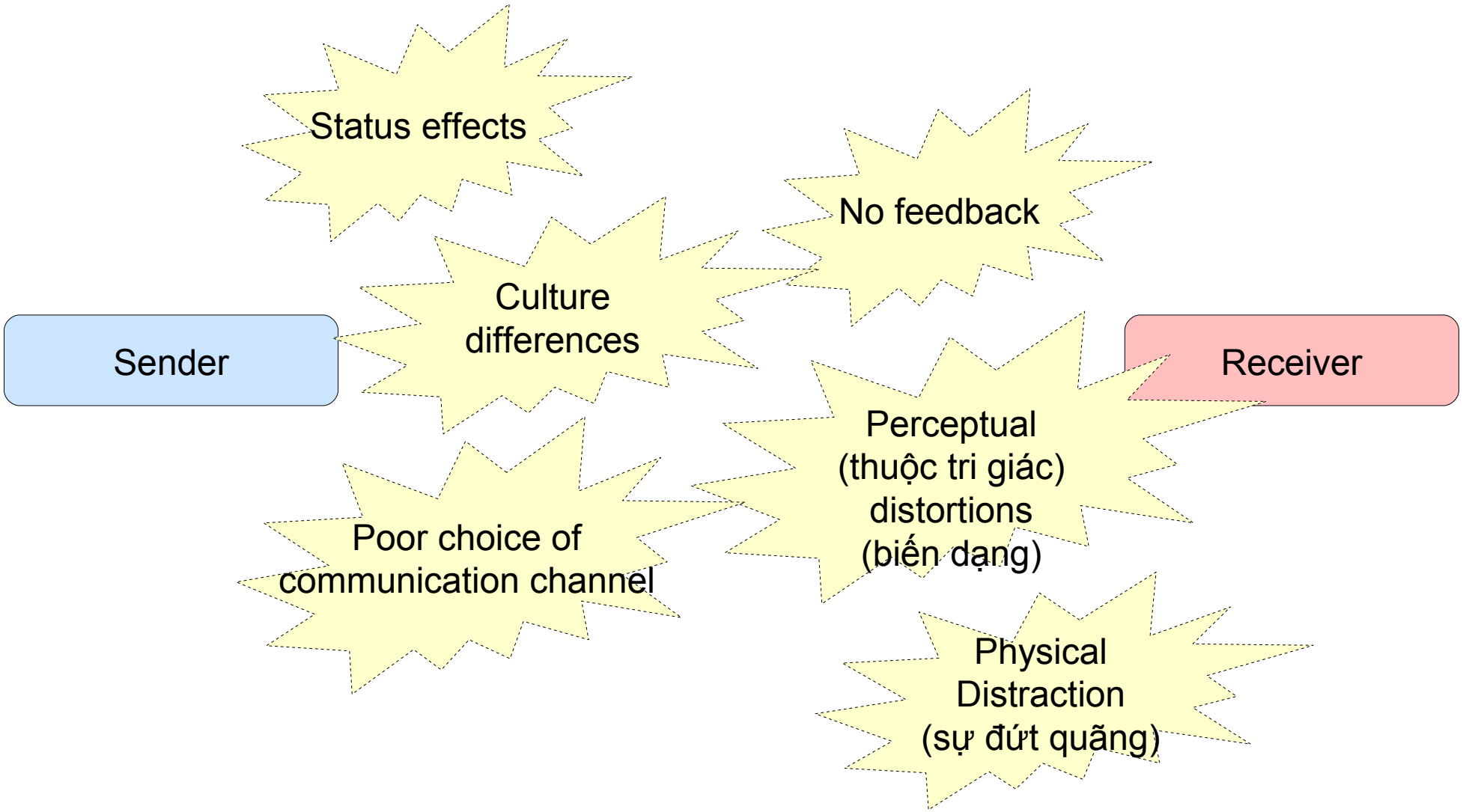
Find some hints on DMS:
Documents/010_ENG/000_General/6_Meeting/2013K/Info_Sharing_Meeting

Communication process



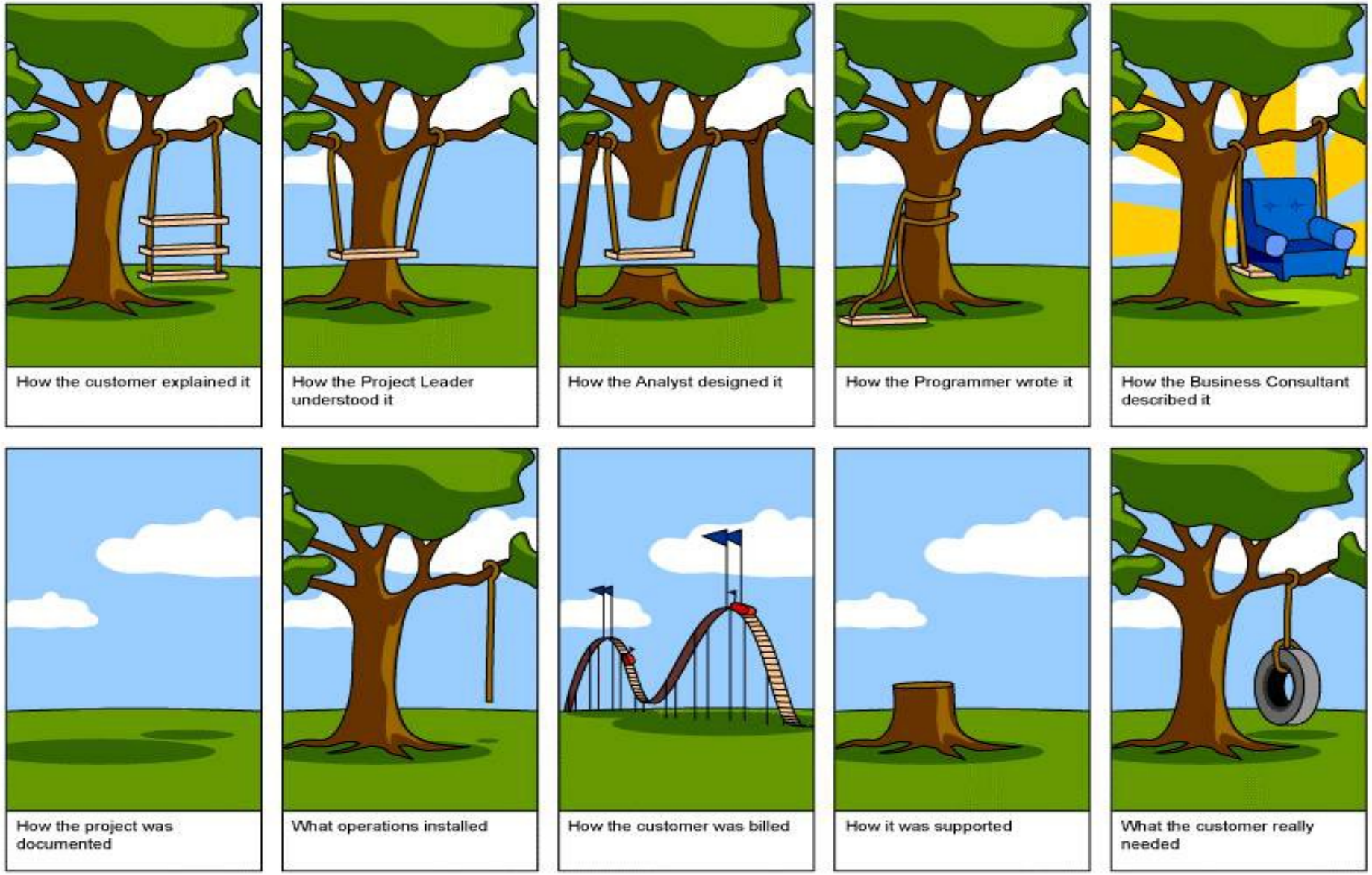
(Source: MBA-IMC/Dr. Joe Nason, 2007)

Barriers in communication



(Source: MBA-IMC/Dr. Joe Nason, 2007)

Barriers in communication - example



Meeting

- Goal: each meeting must have purpose
  and must end with conclusion & action items (← outputs of the meeting).

- In your opinion, which are your common mistakes in meeting ?
  How to avoid them ?

- Some notes about participants in the meetings.

Meeting

- Goal: each meeting must have purpose
  and must end with conclusion & action items (← outputs of the meeting).

- In your opinion, which are your common mistakes in meeting ?
  How to avoid them ?
  - Need preparation before meeting (ideas)
  - Need a conductor during meeting
  - Need to follow up action items after meeting

- Some notes about participants in the meetings.

Participants in meeting . . .

A. The talker

- Likes to hear their own voice
- Joins just about all topics
- Wastes time for everybody
- Drags meeting at length

"Politely make sure everyone knows that it's okay to speak about an issue, but no one likes unnecessarily long meeting"

Source: Kissey/Sabah 2001

Participants in meeting . . .

B. The belligerent (người tham chiến)

- Just doesn't agree with anyone
- "Explaining" means yelling & scream
- Puts everyone on the defensive
- Not willing to listen
- Not willing to compromise

"Let him/her be the chairperson or tell him/her firmly of the poor behavior".

Source: Kissey/Sabah 2001

Participants in meeting . . .

C. The sleeper

- Goes to zzz….ZZZZZZ
- Suddenly joins midway
- Makes “nosy noise”

“Talk with the sleeper to stay awake in future or station somebody near him/her”

Source: Kissey/Sabah 2001

Participants in meeting . . .

D. The interrupter

- Always jumps in conversation
- Can't wait his/her turn to speak
- Always his/her interruption is irrelevant

"Discuss, suggest nice and un-embarrassing ways that you can help overcome his/her personality trait".

Source: Kissey/Sabah 2001

Participants in meeting . . .

E. The wanderer (lang thang) /sideliner (ngoài lề)

- Goes “Off on a tangent (đường ranh giới)”
- Takes everyone to his trip

“It’s best to take this discussion later perhaps during coffee break or handle it off-line”

Source: Kissey/Sabah 2001

Participants in meeting . . .

F. The back-sitter

- Wants to escape
- Not interested in the meeting
- Will start own meeting at the back

"Don't let him/her join in the next meeting
Or Ask him/her opinion on any juncture (sự việc)".

Source: Kissey/Sabah 2001

Effective communication in meeting

1. Define the purpose of communication
2. Limit the extent of communication
3. Ensure the right people are there
4. Get the right number of people
5. Facilitate introductions
6. Be active
7. Be rational but open-minded
8. Be brief, be simple and be organised
9. Make good use of non-verbal communication
10. Stay calm and don't argue
11. Avoid personal attacks
12. Bring the communication to a conclusion and action items.

Making solutions – case study

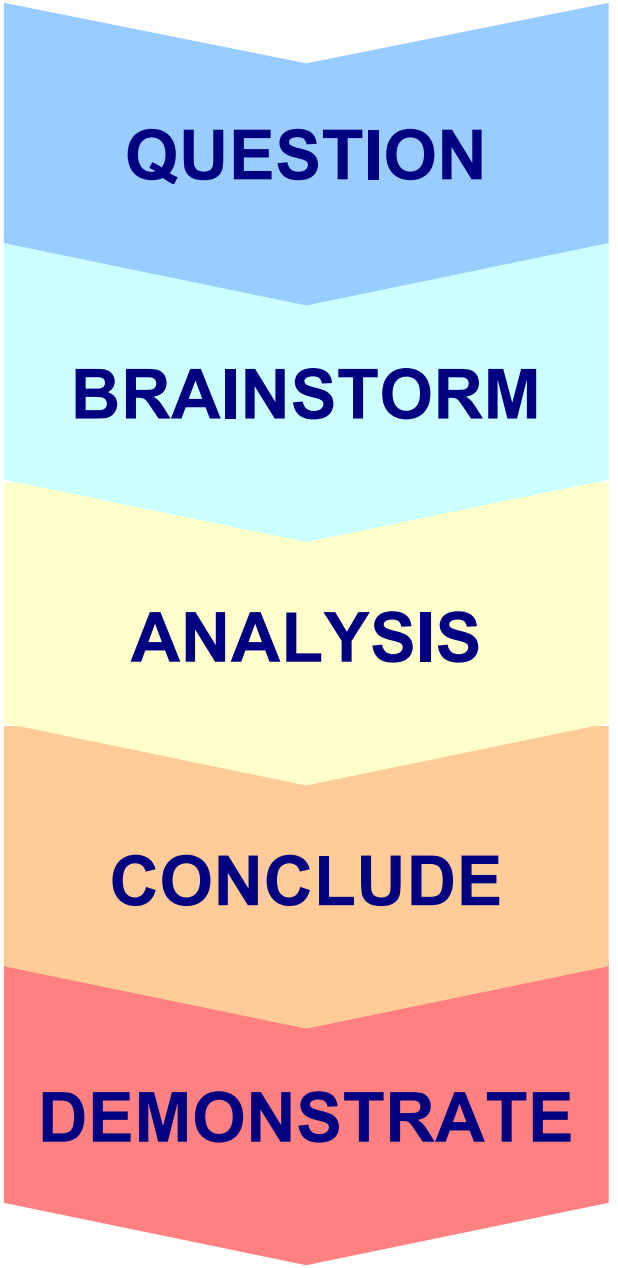
Start-up

How have you been making the solutions ?

Solution = Idea(s) + Analysis

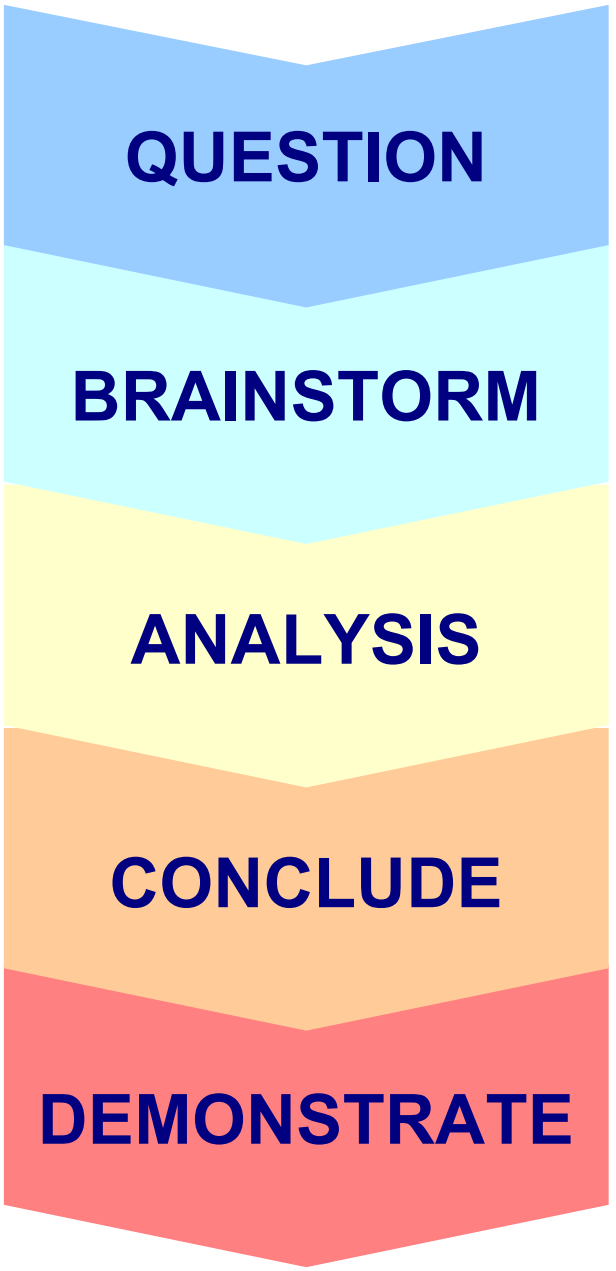
Making solutions

within 05 steps ...

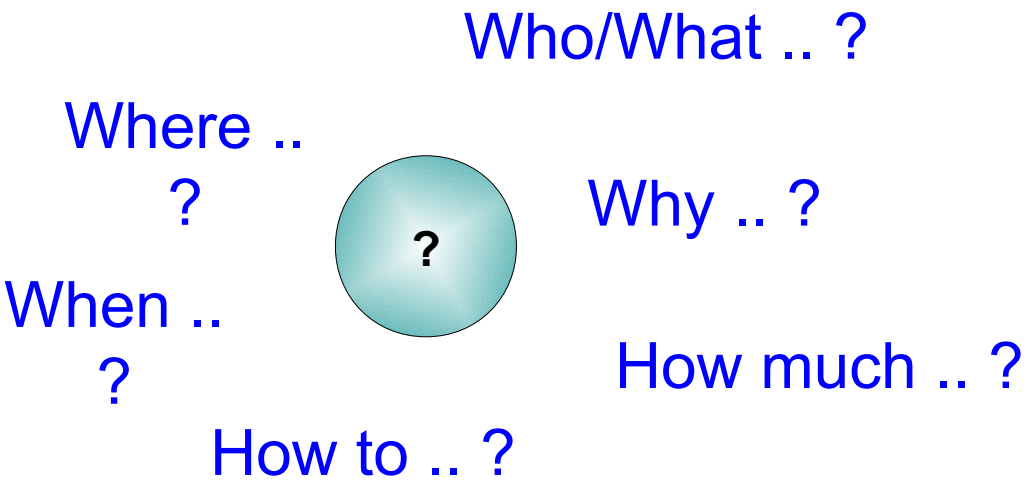


Making solutions

within 05 steps ...

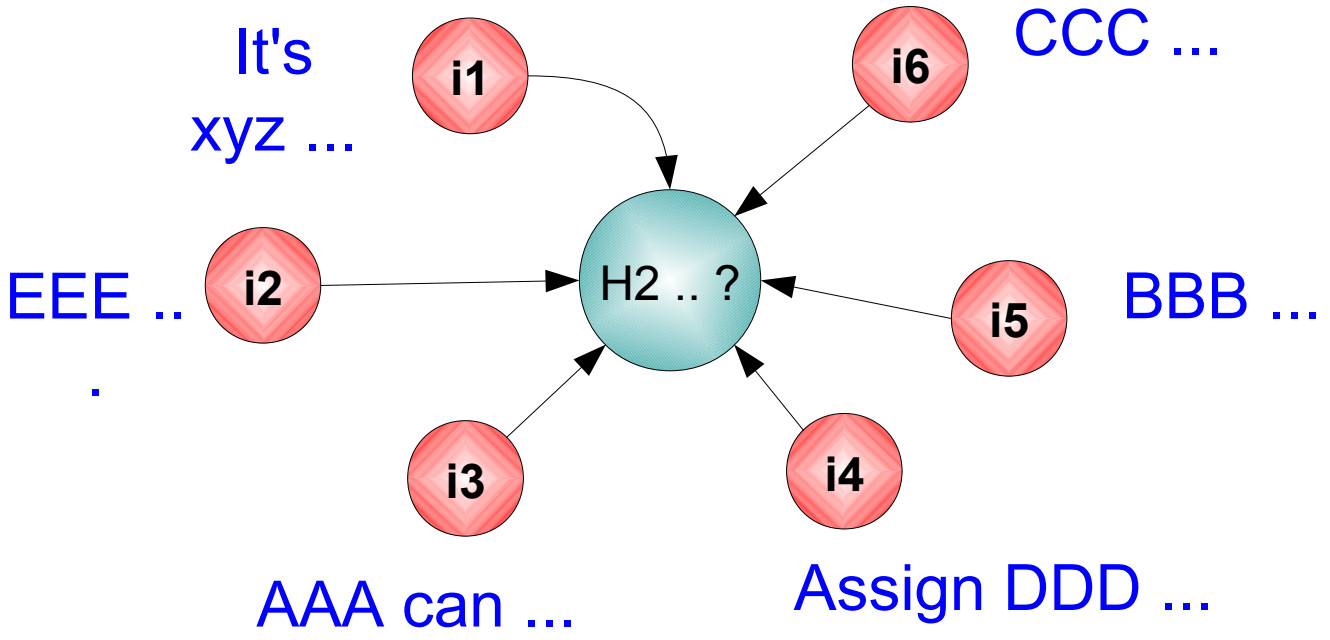


Step 1: asking a right question.



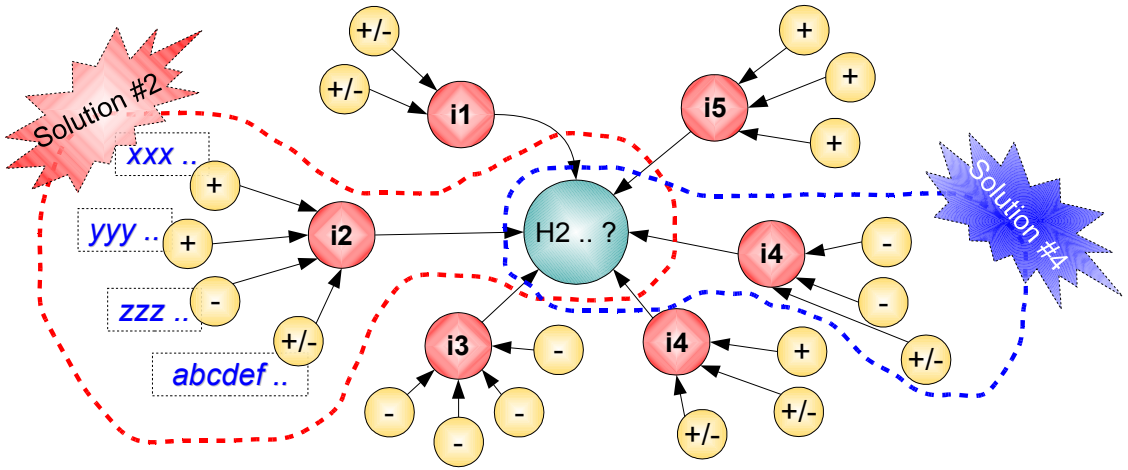
<u>Note:</u> The question should be specific and short enough.
If it's long or complex, break it down to several smaller questions.

Step 2: brainstorming ideas.



Rules: #1. No judgement. i.e. there's neither wrong idea, nor right idea.

Step 3: strength/weakness analysing.



(Q1) "H2 ...?"	(i1) "It's xzy .."	(i2) "EEE .."	(i3) ".."	(i4) ".."	(i5) ".."	(i6) ".."
(+)						
(-)						
(+/-)						

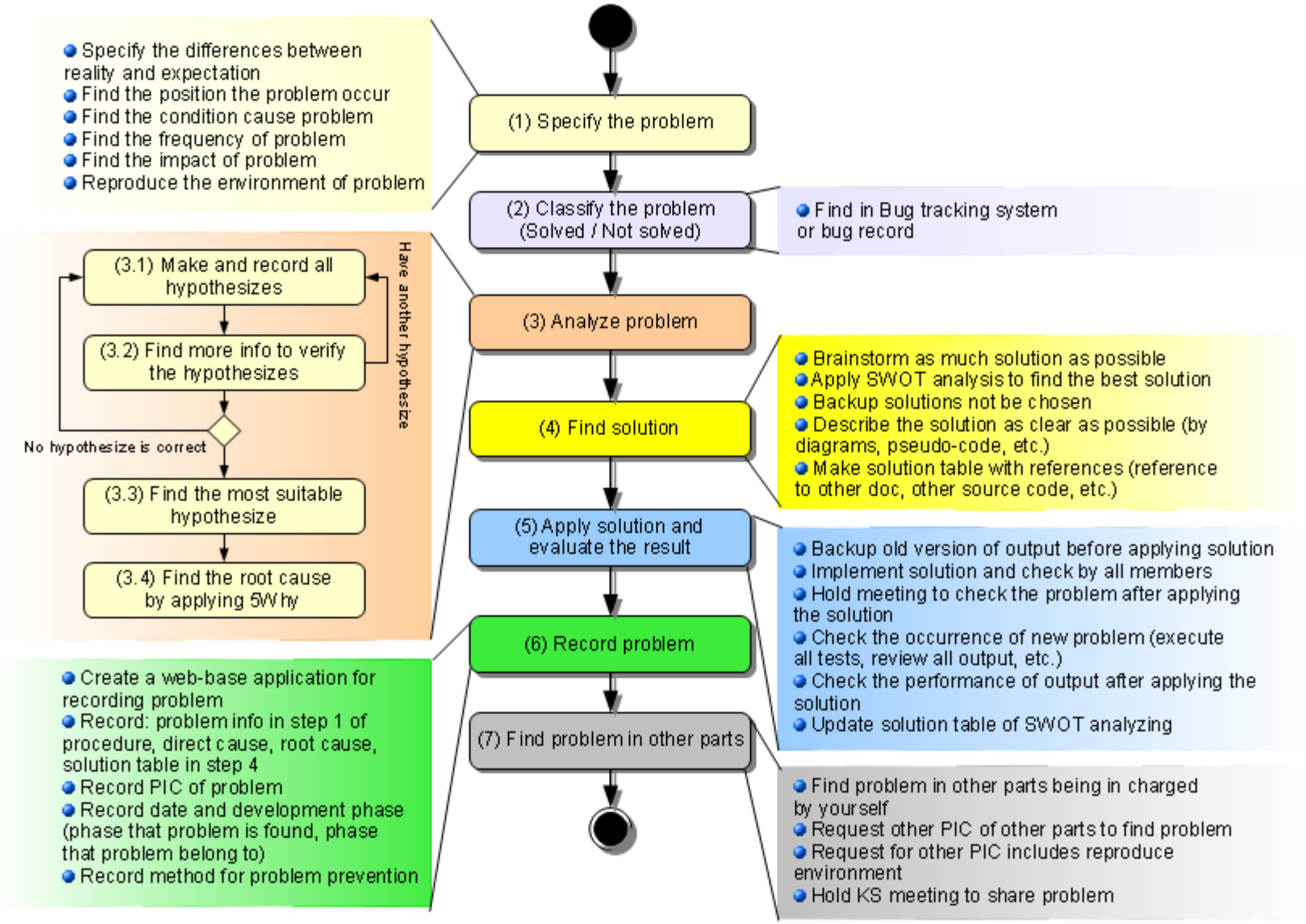
QUESTION
BRAINSTORM
ANALYSIS
CONCLUDE
DEMONSTRATE

Step 4: choosing suitable solution.

(Q1) "H2 ...?"	(i1) "It's xzy .."	(i2) "EEE .."	(i3) ".."	(i4) ".."	(i5) ".."	(i6) ".."
(+)						
(-)						
(+/-)						
Opportunities						
Threats/Risks						
Priority	2	4	1	6	5	3
Conclusion	(backup)	(backup)	Chosen	(backup)	(backup)	(backup)

Not must, but helpful to make conclusion

Step 5: demonstrate the conclusion



Business ethics

What does 'ethics' mean?

ethic [noun]
a system of accepted beliefs which control behavior, especially such a system based on morals

ethics [noun]
the study of what is morally right and what is not

(Source: http://www.dictionary.cambridge.org)

Basic question for a business ethics

What can we know ?

What shall we do ?

What may we hope ?

Which of these questions is the elementary question of ethics ?

(Source: MBA-IMC/Rainer Beedgen, 2008)

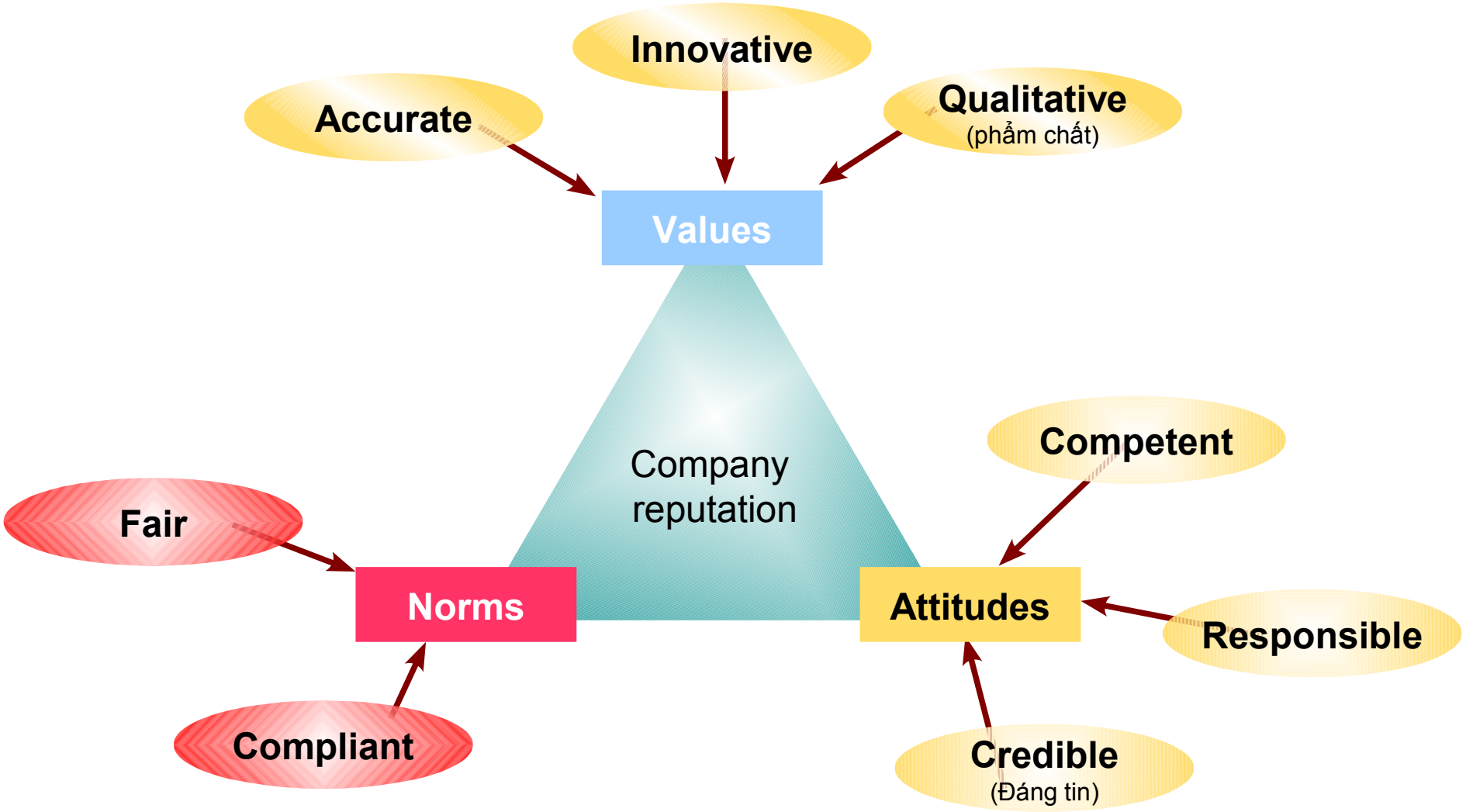
Elementary question of ethics

What shall we do ?

1. This is more than simply to know !
2. This is less than to design the future !

(Source: MBA-IMC/Rainer Beedgen, 2008)

Ethics in engineering defines reputation



Ethics of manager

Discussion:

Manager encourages engineers to work hard, improve skills. Therefore, he/she can create more products. Finally, the engineers can gain higher salary, bonus that matches with his/her contribution, productivity.

Question: Is this good in term of business ethics?

Ethics of developer

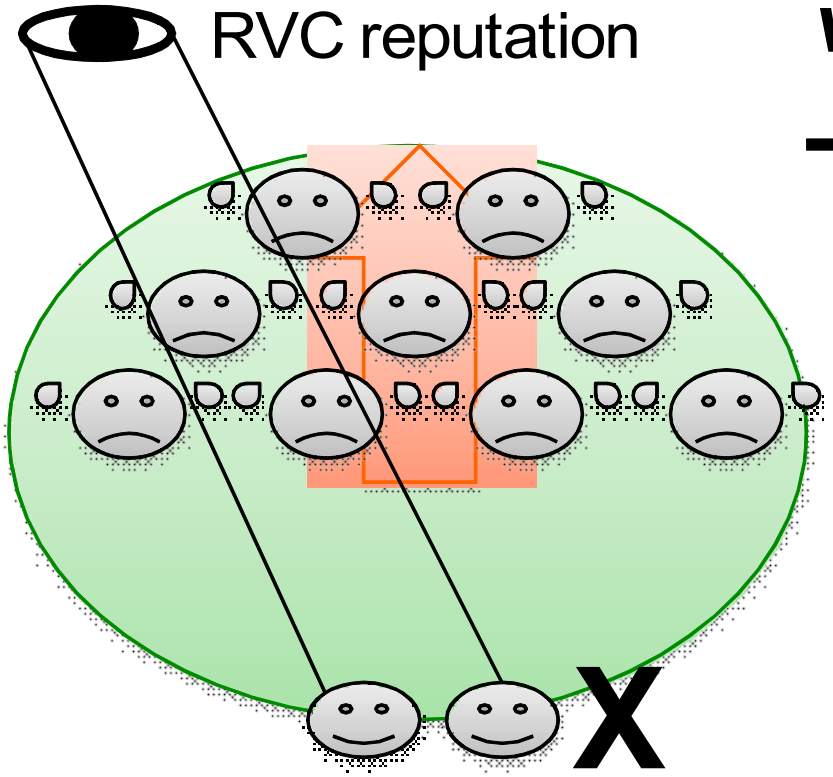
Discussion:

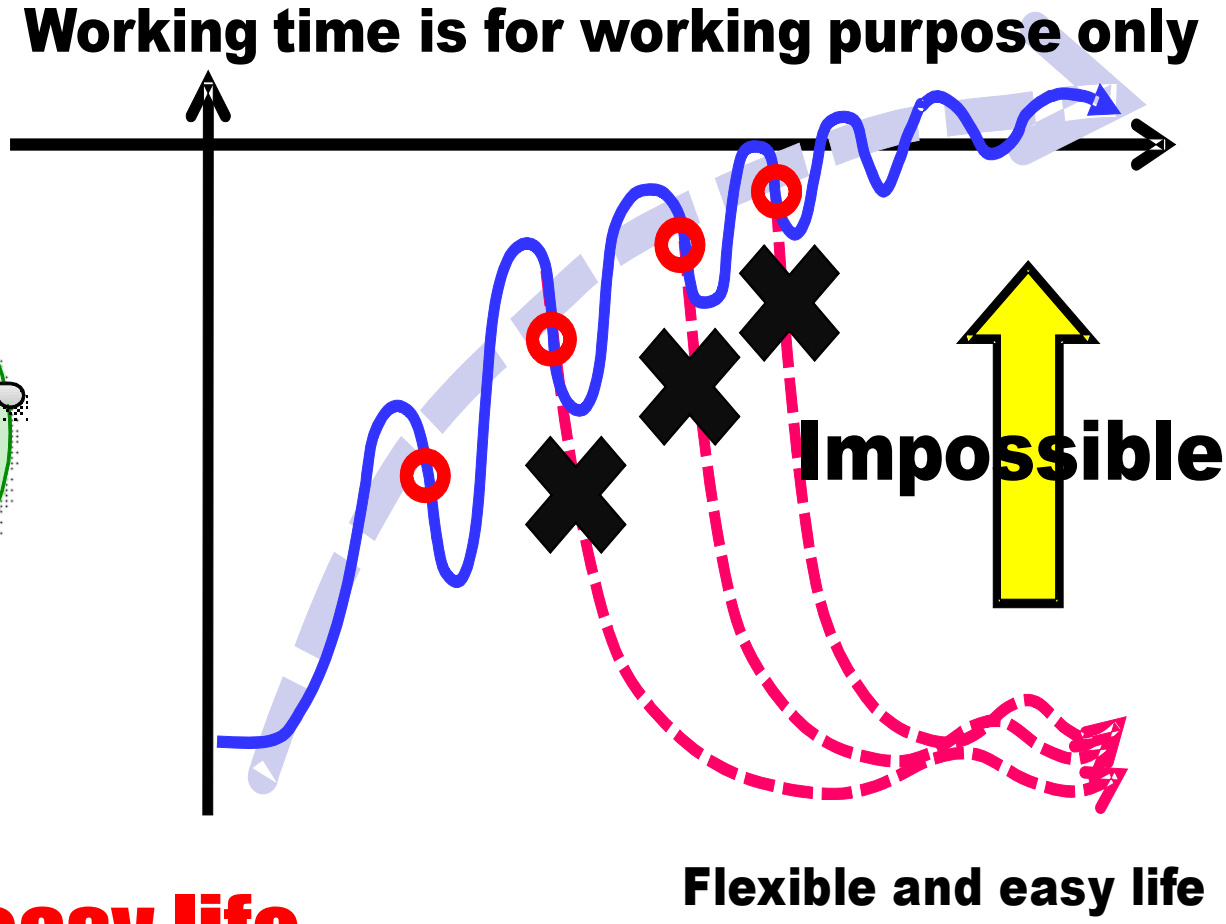
Your customer is the biggest phone maker in Japan.
And you have developed applications for the new phone model which will be sold in the end of March 09 to millions of end-users.

Now you find defects in about release day.
The defects may cause the phone restart music player application accidentally. And your customer has not known yet.
But there's not much time left for fixing, testing and releasing the SW punctually as the original deadlines.

Question: What should you do? And why should you do so?

Ethics of employee



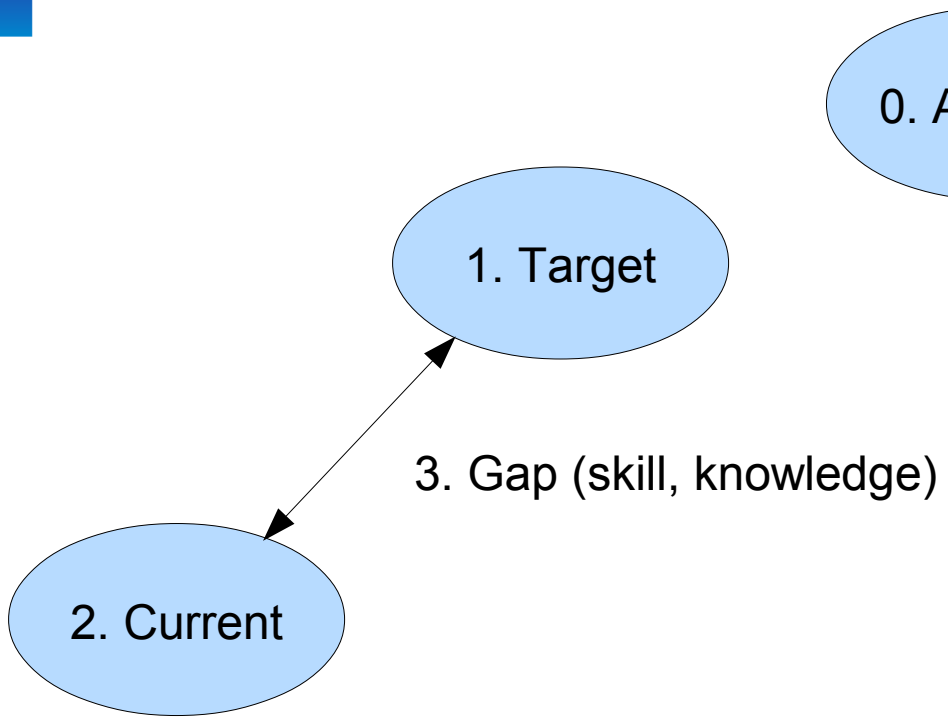


Once we return to easy life,

we can't regain the professional working style

Define your career path

Process to define career path



5. Improvement plan

	2013	2014	2015	2016
Skill	Lv1	Lv2	Lv2	Lv3
Knowledge	Wide	Deep	Widen	Widen

6. Register improvement target to your manager and update plan yearly using PDCA cycle

4. Breakdown

Example: Problem Solving skill	
Level 1	Identify problem & able to reproduce it
Level 2	Isolate problem in a large scale system
Level 3	Root cause analysis & similar cases detection
Level 4	Provide systematic solution & prevention

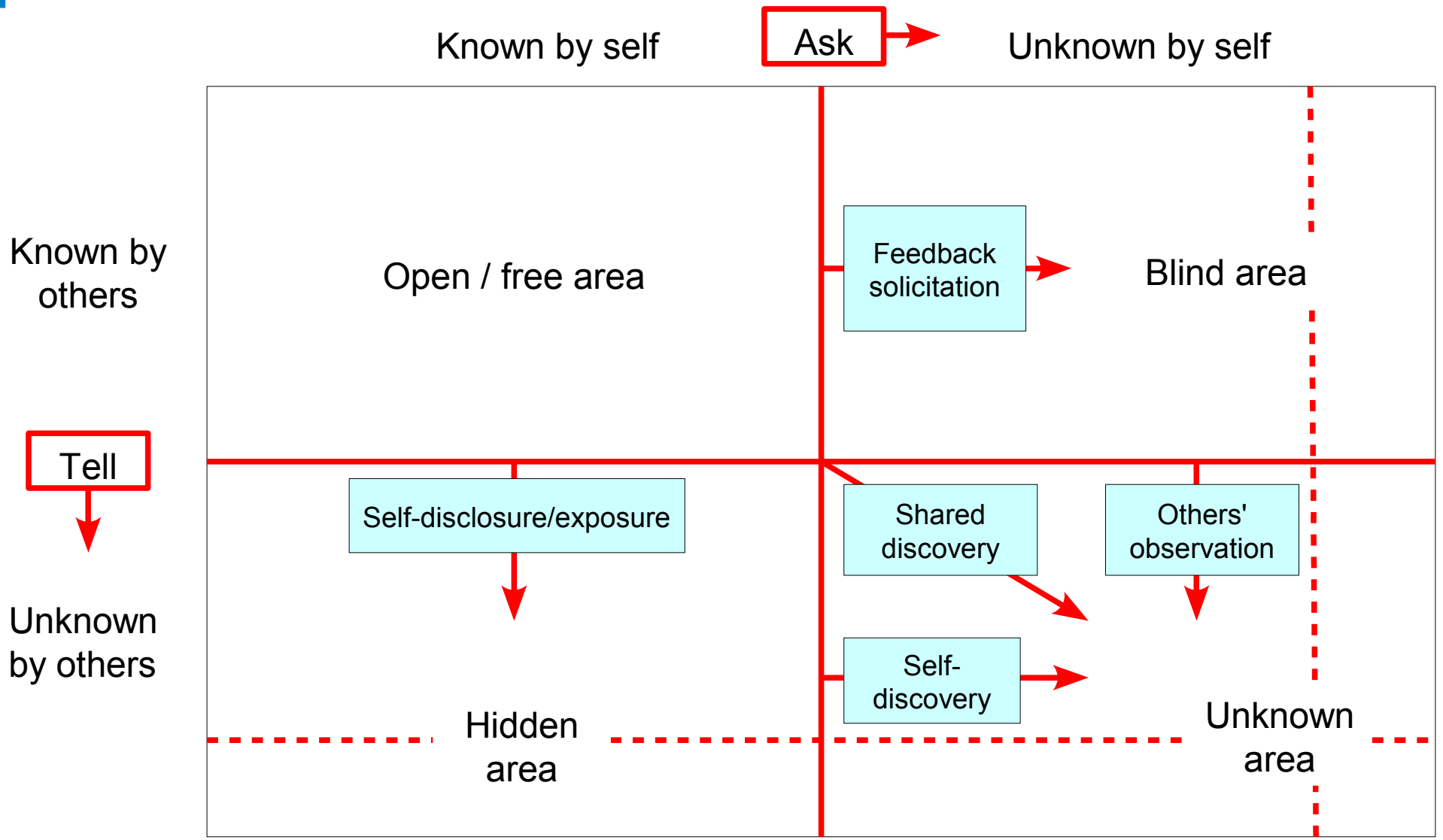
Technical knowledge	
Wide	What? How to?
Deep	Why? For what?
Widen	Knowledge of different fields (HW/SW, App/FW/driver)
Deepen	Understand several fields

End of training.
Thank you for your cooperation.

Let's build tomorrow products together!

Renesas Design Vietnam Co., Ltd.

The Johari window



(Source: MBA-IMC/Dr. Joe Nason, 2007)