

Quality Management of Software and Systems (WS19/20)

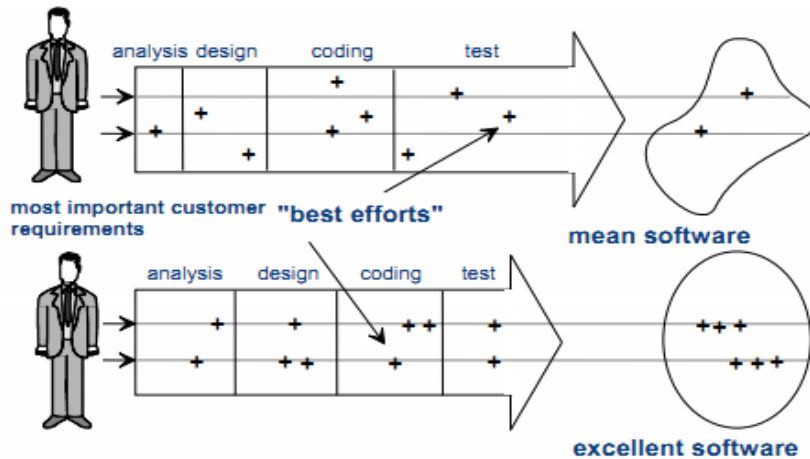
Problem Set 6

Problem 1: Quality Function Deployment Basics

a) What is the fundamental idea of QFD?

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Systematic application of the resources in those positions which ensure the fulfillment of the most important customer requirements.



b) What are the goals of QFD?

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- Preventive-oriented quality management
- Serving the purpose
- Fulfillment of customer expectations

c) What is the procedure followed to apply QFD?

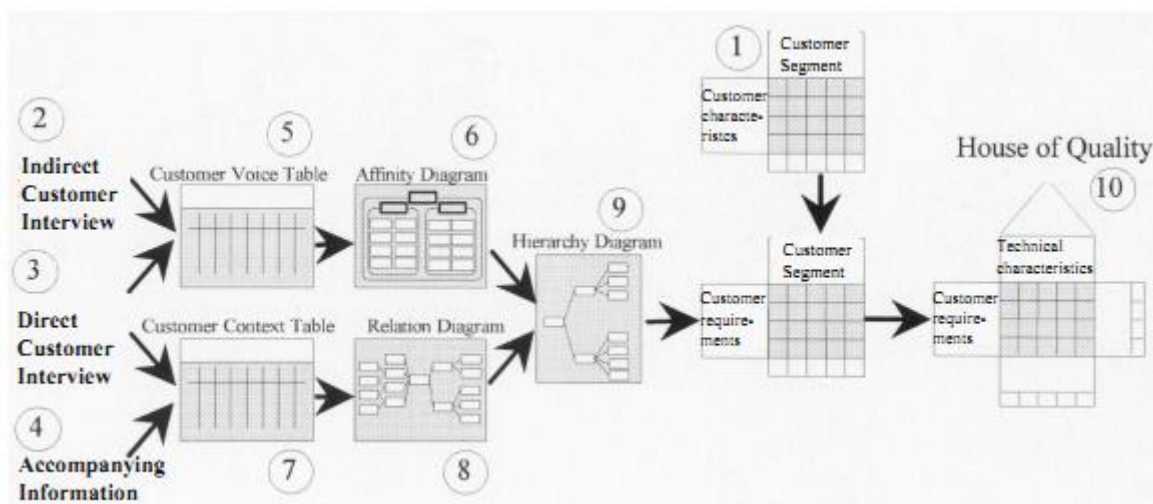
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- Identification of customer requirements
- Weighting of customer requirements
- Weighted customer requirements passed on to the phases of the software development process where they are handled and realized

Problem 2: Quality Function Deployment Process

How is QFD applied in the requirement analysis phase? (Please support your explanation by drawing a graph) What are the different activities and products obtained? Please give a short description of each one.

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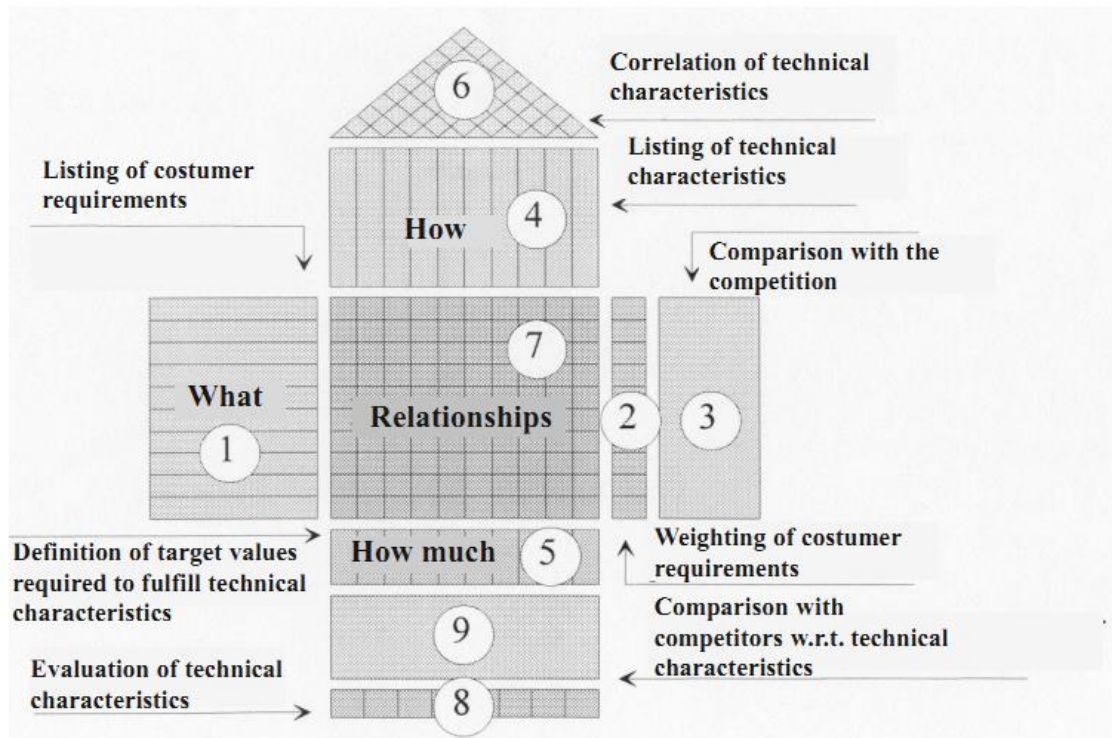
Problem 3: The house of quality

a) What is the goal of the house of quality?

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Realization of the customer requirements in physical characteristics in consideration of important factors for the development process.

b) Complete and explain the steps of the house of quality by using the following graph:

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Step-1. List customer requirements.

Step-2. Weight customer requirements in pair wise comparison.

Step-3. Make comparisons with competitors to determine objectives for a positioning in the market.

Step-4. Determine the technical characteristics for the realization of the customer requirements.

Step-5. Target values of these technical characteristics (5) and provide the guideline values for the fulfillment of the technical characteristics.

Step-6. Determine to what extent technical characteristics influence each other and if these dependences are positive or negative.

Step-7. The relation/connection/correlation matrix (7)

- Gives information about which customer requirements are realized by which technical characteristics
- Here it can be tested/checked already if a customer requirement has been forgotten (row did not get a symbol), or
- If a technical characteristic exists which has no relation to customer requirements (column is empty)
- Product of the weighting of a customer requirement and the factor of the relation gives the local priority of a technical characteristic

Step-8. The sum of these priorities gives the evaluation of the technical characteristics. Characteristics get a high evaluation if they relate to highly important or to many requirements

Step-9. The current plan is compared to similar solutions provided by competitors.

Problem 4: QFD Case Study Navigation System

A car company would like to improve the navigation system currently installed in its cars. For this purpose, they hired the car navigation system producer company "Nagivation2000". The customer segments to be considered when developing the new system are:

- Car test drivers
- People in the quality assurance department
- System integrators
- Manager

Your task will be to help "Navigation2000" to analyze the requirements by applying QFD. In particular, you will have to determine:

- The importance of each customer segment (determination of target groups)
- The importance of customer requirements

In order to do this, the following information is given to you (see Appendix):

- Important criteria for the company: "criteria priorities" table
- Incomplete version of the "transfer of criteria priorities" table
- Customer voice table (with the initial requirements)
- Customer context tables

To determine the importance of each customer segment, you will have to perform the following activities:

- Normalize the "criteria priorities" table:

	Saleable number	Buying decision ability	Multiplier effect	Sum, Σ
Saleable number	1 \Rightarrow 0.1	0.2 \Rightarrow 0.13	0.33 \Rightarrow 0.08	0.31 \Rightarrow 0.1
Buying decision ability	5 \Rightarrow 0.6	1 \Rightarrow 0.65	3 \Rightarrow 0.69	1.94 \Rightarrow 0.65
Multiplier effect	3 \Rightarrow 0.3	0.33 \Rightarrow 2.2	1 \Rightarrow 0.23	0.75 \Rightarrow 0.25
Sum, Σ	Σ 9	Σ 1.53	Σ 4.33	Σ 3

- Complete the transfer of criteria priorities table: Calculate the segment priority

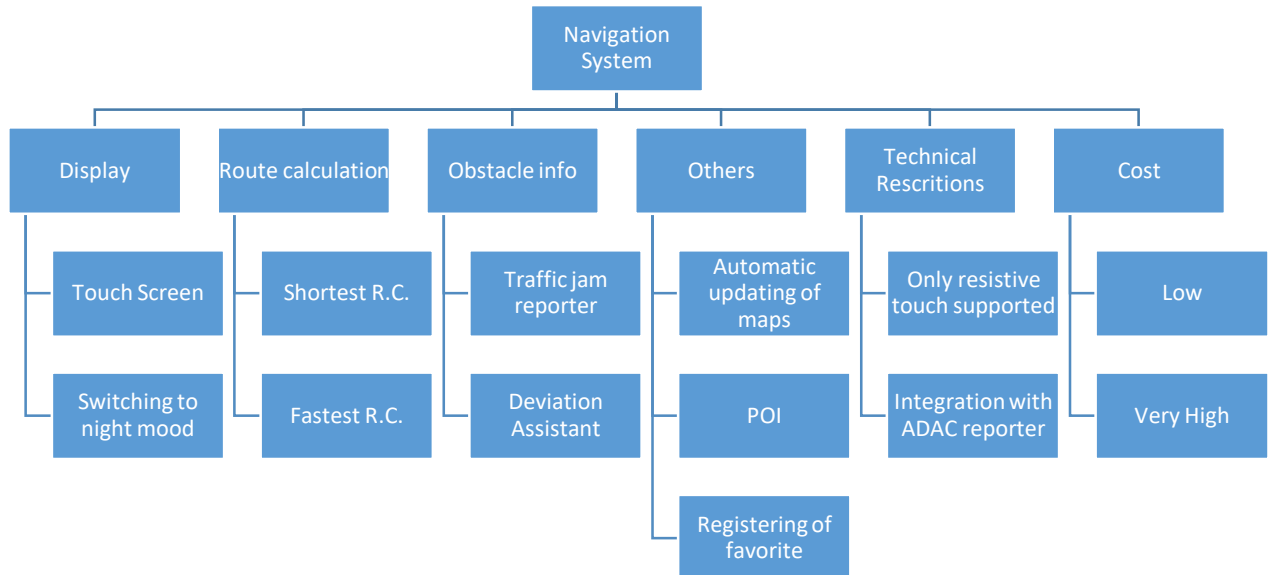
	Car test driver	Quality assurer	System integrator	Manager	
Saleable number Priority: 10%	sale: 7000 local: 0.67 global: 6.7%	sale: 2000 local: 0.19 global: 1.9%	sale: 1000 local: 0.1 global: 1%	sale: 500 local: 0.05 global: 0.5%	Σ 10500 Σ 1 Σ 10%
Buying decision ability Priority: 65%	1 local: 0.08 global: 5.2%	3 local: 0.25 global: 16.25%	3 local: 0.25 global: 16.25%	5 local: 0.42 global: 27.3%	Σ 12 Σ 1 Σ 65%
Multiplier effect Priority: 25%	1 local: 0.08 global: 2%	3 local: 0.25 global: 6.25%	3 local: 0.25 global: 6.25%	5 local: 0.42 global: 10.5%	Σ 12 Σ 1 Σ 25%
Segment priority	Σ 13.9%	Σ 24.4%	Σ 23.4%	Σ 38.3%	Σ 100%

*** Local: 7000/10500, Global: 0.67* 10

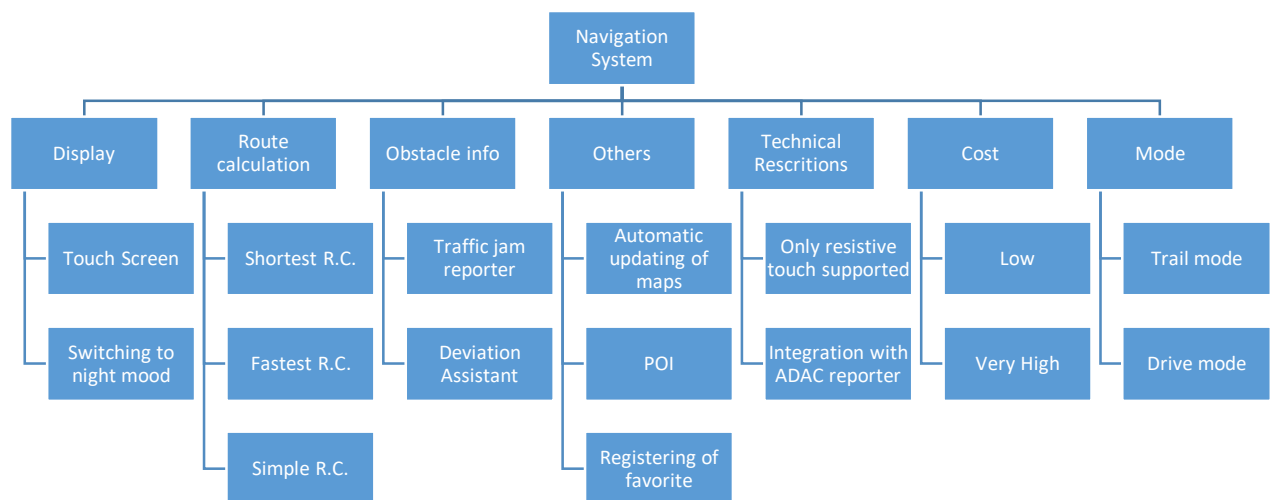
To determine the importance of customer requirements you will have to perform the following activities:

- c) Create an affinity diagram for the customer voice table

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Affinity diagram for the customer voice table:



- d) Create a hierarchy diagram by using the customer context table and the affinity diagram



- e) Create a “customer segments – customer requirements” table **based on the hierarchy diagram** and the **customer segments priority**

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Given (Appendix 1),

Information about the scale to be used to set priorities:

- unimportant = 0
- minor important = 1
- mean = 3
- strong = 5
- very strong = 7
- extremely strong = 9

customer segments – customer requirements table:

	Car test driver 13.9%	Quality assurer 24.4%	System integrator 23.4%	Manager 38.3%	Total
Touchscreen	3 / 0.695%	3 / 1.144%	5 / 2.25%	5 / 2.128%	6.217%
Automatic updating of maps and routes	5 / 1.158%	5 / 1.906%	5 / 2.25%	7 / 2.979%	8.293%
Traffic jam reporter	3 / 0.695%	5 / 1.906%	3 / 1.35%	7 / 2.979%	6.93%
Deviation assistant	3 / 0.695%	5 / 1.906%	3 / 1.35%	7 / 2.979%	6.93%
Switching to night navigation	3 / 0.695%	5 / 1.906%	1 / 0.45%	5 / 2.128%	5.179%
Points of interest search	5 / 1.158%	3 / 1.144%	1 / 0.45%	3 / 1.277%	4.029%
Registering of fav addresses	1 / 0.232%	5 / 1.906%	1 / 0.45%	3 / 1.277%	3.865%
Cal of the shortest route	7 / 1.622%	5 / 1.906%	3 / 1.35%	5 / 2.128%	7.006%
Cal of the fastest route	7 / 1.622%	5 / 1.906%	3 / 1.35%	5 / 2.128%	7.006%
Only resistive touchscreen supported	3 / 0.695%	5 / 1.906%	1 / 0.45%	7 / 2.979%	6.03%
Integration with ADAC reporter system	5 / 1.158%	3 / 1.144%	9 / 4.05%	5 / 2.128%	8.48%
Low cost	1 / 0.232%	1 / 0.381%	3 / 1.35%	9 / 3.83%	5.793%
High cost	1 / 0.232%	1 / 0.381%	3 / 1.35%	9 / 3.83%	5.793%
Sample route calculation	5 / 1.158%	5 / 1.906%	3 / 1.35%	5 / 2.128%	6.542%
Driving mode	5 / 1.158%	3 / 1.144%	3 / 1.35%	5 / 2.128%	5.78%
Trial mode	3 / 0.695%	5 / 1.906%	5 / 2.25%	3 / 1.277%	6.128%
	60 / 13.9%	64 / 24.4%	52 / 23.4%	90 / 38.3%	100%

*** Note: Values from Appendix 1, $(3 \times 13.9) / 60 = 0.695\%$