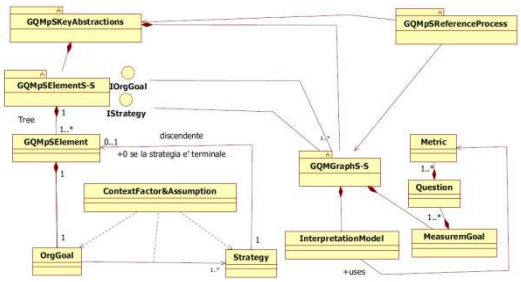
Questions based on general aspects discussed in the ISSSR 2016-2017 course
ISSSR 2016-2017-Questions based on general and theoretical aspects-re02-20170617

1. Agile approach

I. Explain the Scrum artifact Product Backlog (0) 0
II. Explain the Scrum artifact Sprint Backlog (1) 1
III. Explain the Scrum artifact Increment (2) 2
IV. Explain the Scrum role Product Owner (3) 3
V. Explain the Scrum role Scrum Master (4) 4
VI. Explain the Scrum role Development Team (5) 5
VII. Explain the Scrum meeting Sprint Planning Meeting (6) 6
VIII. Explain the Scrum meeting Daily Scrum (7) 7
IX. Explain the Scrum meeting Scrum Sprint Review (8) 8
X. Explain the Scrum meeting Scrum Sprint Retrospective (9) 9
XI. Explain the Agile requirement types User story and Epic (0) 0

2. GQM + Strategies (GQMpS) in a Nutshell

I. Describe in a half page the GQMpS' Key Abstractions 1
II. Describe the GQMpS' Basic Approach 2
III. Define the meaning of the GQMpS Basic Approach's Terms Goal, and Strategy 3
IV. Explain why the GQMpS Basic approach requires that measurement data are collected 4
V. Explain which are the GQMpS' major perspectives 5
VI. Explain the intervention of Context factors and Assumptions in the GQMpS Organization Planning perspective 6
VII. Explain when it stops the decomposition process of organization goals into strategies in the GQMpS Organization Planning perspective 7
VIII. Explain the contribution of GQM in the GQMpS Control Perspective 8
IX. Explain the function of interpretation model in the GQMpS Control Perspective 9
X. Explain the GQMpS Grid 0
XI. Explain the types of nodes participating to a grid, and their possible relationships 1
XII. How many GQM graphs could be associated to a node of a GQMpS grid, and why? 2
XIII. Explain briefly the following class diagram: 3



XIV. Explain the Organization Goal Template and its fields 4
XV. Explain the Measurement Goal Template and its fields 5
XVI. In what extent the GQMpS process model is a framework? 6
XVII. List and briefly comment the three stages of the GQMpS process model 7
XVIII. Describe the specific goal, and output of the GQMpS phase 0 8
XIX. Describe the specific goal, and input and output of the GQMpS phase 1 9
XX. Describe the specific goal, and input and output of the GQMpS phase 2 0
XXI. Describe the specific goal, and input and output of the GQMpS phase 3 1
XXII. Describe the specific goal, and input and output of the GQMpS phase 4 2

XXIII. Describe the specific goal, and input and output of the GQMpS phase 5 3

XXIV. Describe the specific goal, and input and output of the GQMpS phase 6 4

XXV. Raison on kinds of domain where it should be enough to execute the GQMpS "phases" in sequence and, vice versa, when they should be intended as parallel messaging sub-processes. 5

XXVI. Show a simple instance of Organizational Goal and follow its handling through a GQMpS cycle. 6

3. Measurement

I. Theory of Measurement

i. Comment the following ISO 9127 definition: "*Measurement is the process by which numbers or symbols are mapped to attributes of entities in the real world in such a way as to describe them according to clearly defined rules.*" 7

ii. What is the meaning of "Measure"? 8

iii. What is an empirical relational system, ERS? 9

iv. What is a formal relational system, FRS? 0

v. Explain informally the following formal definition: *A measurement model, MM, is an ..... homomorphism of ERS on FRS,* μ: **E** $\rightarrow$ **F**: 1

- $\varsigma_i(e_1, e_2, \ldots e_{ki}) \Leftrightarrow S_i(\mu(e_1), \mu(e_2), \ldots \mu(e_{ki}))$ $(i=1..n)$;
- $\mu(\Omega_j(e_1, e_2, \ldots e_{sj}) = \bullet_j((\mu(e_1), \mu(e_2), \ldots \mu(e_{sj}))$ $(j=1..m)$.

vi. What is a scale? 2

vii. Explain the characteristics of a Nominal scale 3

viii. Explain the characteristics of an Ordinal scale 4

ix. Explain the characteristics of an Interval scale 5

x. Explain the characteristics of a Ratio scale 6

xi. Give a list of operations that can be applied to a Real Interval scale bur are not applicable to a Real Ordinal scale 7

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xii. Give a list of operations that can be applied to a Real Ratio scale bur are not applicable to a Real Interval scale 9

xiii. Describe briefly what is a descriptive measurement model 0

xiv. Describe briefly what is a prescriptive measurement model 1

xv. Describe briefly what is a predictive measurement model 2

II. Software Measurement

i. In Sw. Engineering, what types of entities are expected to be measured? 3

ii. Explain the differences between internal attributes and external attributes of an entity 4

iii. Examples

1. Explain elements of Function Point Analysis 5
2. Explain elements of COCOMO 6

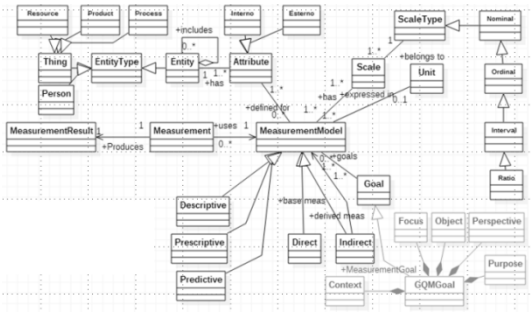
iv. Developing Sw. Measurements: Measurement Models Life Cycle

1. Explain the role of the "Experience Base" in the Measurement Process – ISO/IEC 15939:2007 7
2. Name the phases of the SMMLC and explain their interflows 8
3. Explain the SMMLC Identification phase 9
4. Explain the SMMLC Creation phase 0
5. Explain the SMMLC Acceptance phase 1

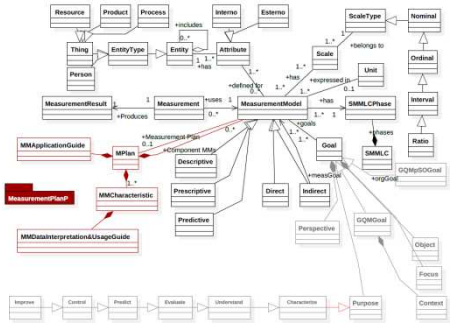
6. Explain the SMMLC Accreditation phase …… 2
7. Explain what is a SMM package and what are its component 3
8. Explain what is a Measurement Plan and what are its component 4

v. Sw. Measurement Ontologies: BMMO, SMMO, RSO

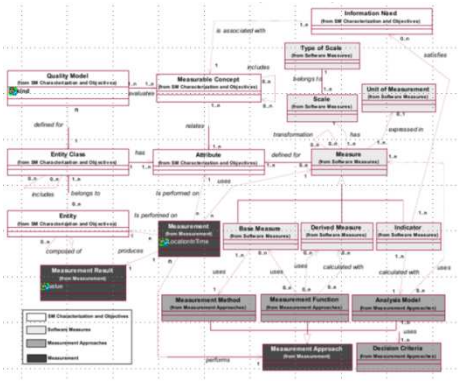
1. Explain the following class diagram (BMMO) 5



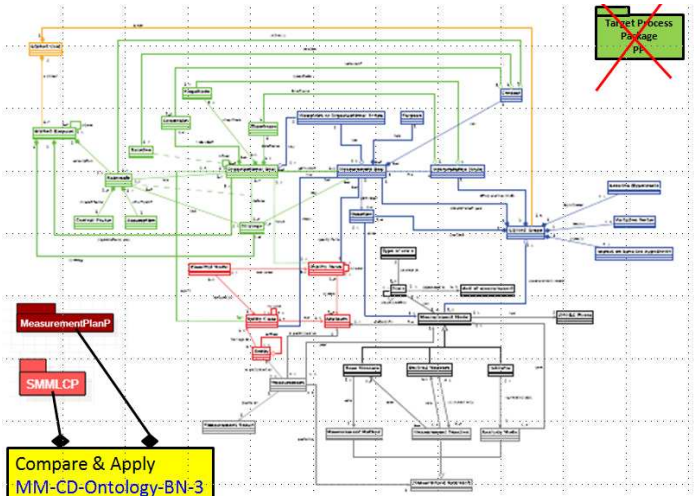
2. Explain the following class diagram (sMMO) 6



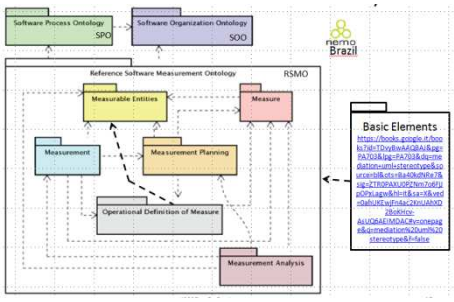
3. Explain the following class diagram (SMMO) 7



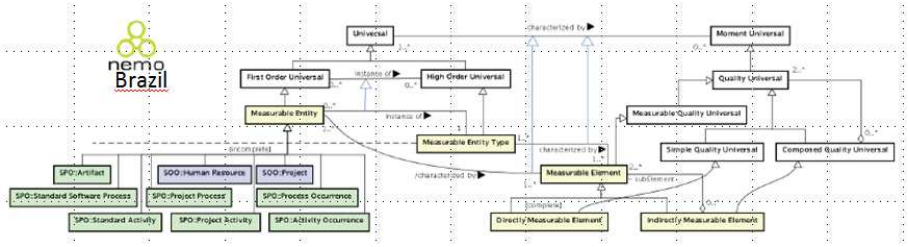
4. Explain the following class diagram (iMMO) 8



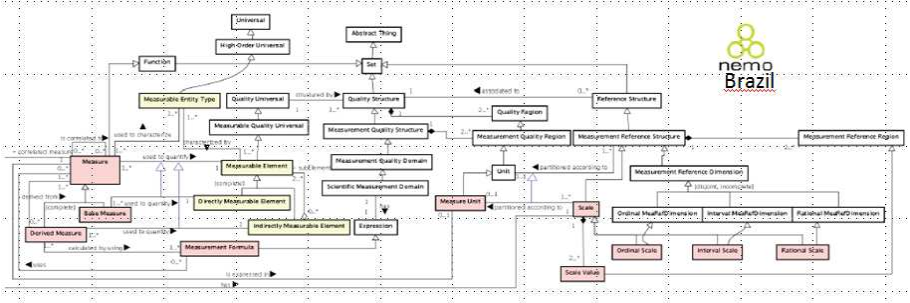
5. Explain the following package diagram (RSO) …… 9



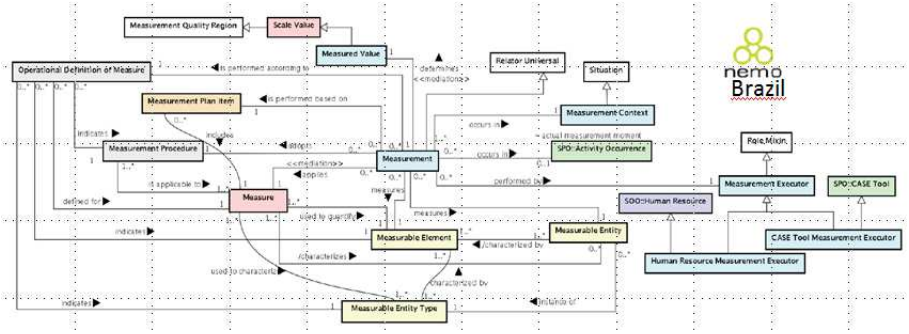
6. Explain the following class diagram (RSO-Measurable Entity sub-O) 0



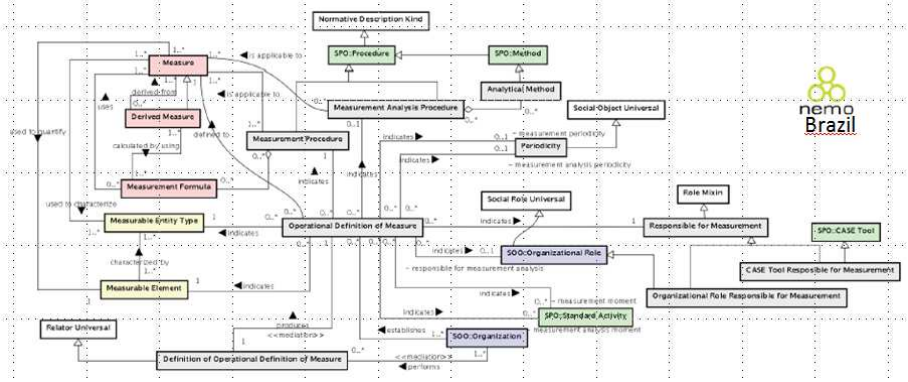
7. Explain the specific aspects of the following class diagram (RSO-Measure sub-O) 1



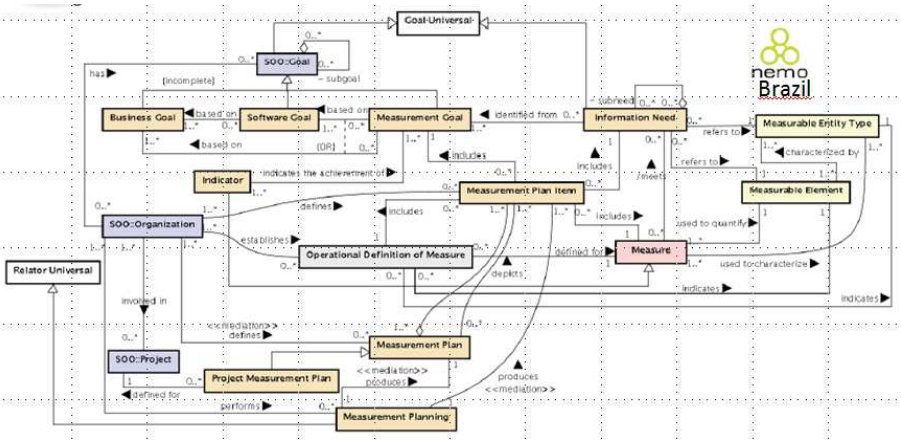
8. Explain the specific aspects of the following class diagram (RSO-Measurement sub-O) 2



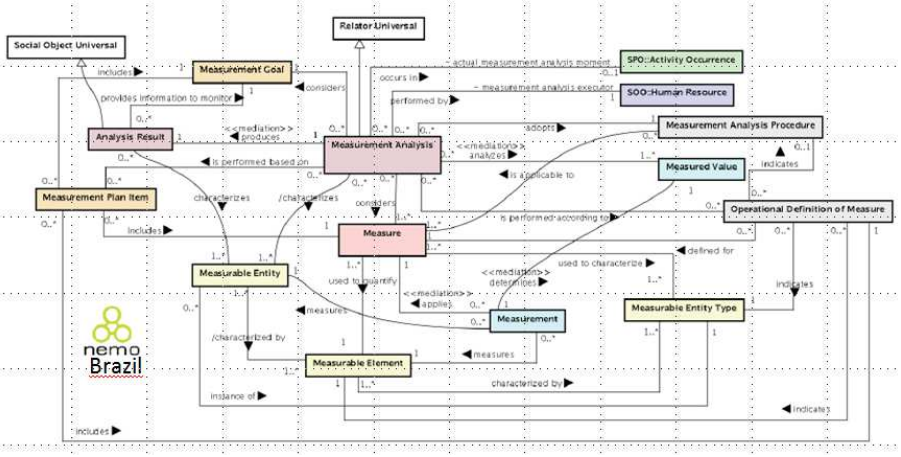
9. Explain the specific aspects of the following class diagram (RSO-Operational Definition of Measure sub-O) 3



10. Explain the specific aspects of the following class diagram (RSO-Measurement Planning sub-O) 4



11. Explain the specific aspects of the following class diagram (RSO-Measurement Analysis sub-O) 5



4. Experimental Sw. Engineering

I. Experimental Models for Validating Sw. Technology

i. Types of methods: Characterize a Historical method …… 6
ii. Types of methods: Characterize an Observational method 7
iii. Types of methods: Characterize a Controlled method 8
iv. Historical method: Characterize a Literature search 9
v. Historical method: Interview vs. Questionnaire …… 0
vi. Observational method: Characterize a Project monitoring …….. 1
vii. Observational method: Characterize a Case-study 2
viii. Observational method: Characterize an Assertion 3
ix. Observational method: Characterize a Field study 4
x. Observational method: Characterize a Pilot study (or Feasibility study) 5
xi. Controlled method: Characterize a Controlled experiment 6
xii. Controlled method: Characterize a Replicated experiment 7

II. Software Engineering Controlled Experiment Life Cycle

i. Show the input and output, and list and explain the phases, of such a Life Cycle 8
ii. Show the definition of a controlled experiment …….. 9
iii. Show the planning of a controlled experiment 0

iv. Give an example of hypotheses formulation …….. 1
v. Explain Variable selection and give an example 2
vi. Explain why randomizations should be applied to subjects in a Sw. Eng. Controlled experiment 3
vii. Explain why randomizations should be applied to objects in a Sw. Eng. Controlled experiment 4
viii. Explain how you would use the collected data to validate hypotheses of a controlled experiment. 5

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5. Alternatives

a. RUP & Sw. Project Mgt.

b. Task assigned per subject