SW DEV PROCESS MODELS

SE_02

1

2

3

TQ MODEL

NEED SPECIAL METHODS MONITORING → ACTIVITIES DOCUMENTATION

ALLOW TO MONITOR.

SW PROCESS MODELS

2

- AGILE
- VERY SMALL INCR.
- CONSTANT CODE IMPR.

EXTREME PROGRAMMING

SPIRAL DEV.

- GRAPH P. 19
- SMALL LOOP
- REQUIREMENTS A PHASE
- NO FIXED PHASES
- RISKS RESOLVED DURING

WATERFALL

1) REQ. ANAL & DEF.
2) SYS & SW DES.
3) IMPL & UNIT TEST.
4) INTEG. & SYS TESTING
5) OPERAT. & MAINT.

FINISH ONE TO JUMP TO THE NEXT.

PROBLEMS:
- DIFFICULTY OF MAKING CHANGES WHEN PROCESS IS UNDERWAY.
- NOT A CLEAR VIEW OF THE FINAL PRODUCT.
- REQS EVOLVES, SO CHANGES, SO ITERATIONS!

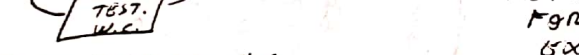
2 APPROACHES:

1) INCREMENTAL DELIVERY

- PROTOTYPAL MODEL:

PROTO: QUICK SOME FUNC.
OBJ: CLAR. DISAMB. REQS.
USE OF MOCKUPS.

- INCREMENTAL:



INCR. DEVELOP.
- GRAPH. P. 12.
- DELIVER PART
- US. REQ. PRIORIT.
- REQ. FROZEN AFTER STAND.

ADV
- FUNC. AVAILABLE EARLIER
- HELP FOR LATER INCR.
- PRIORITIES

FORMAL MODELS

USE OF FORMAL METHODS: ALGORITHMICAL FORMALISM.
EX. P. 16

CORE PROCESS ACTIVITIES

1) SW SPEC. (GR. P. 24)

- ESTABLISH SERVICES REQUIRED AND CONSTRAINTS.
- REQ. ENG. PROCESS.

2) SW DES. & IMPL.

- CONV. SPEC INTO EXEC.
- SW. DESIGN
- IMPL.
- ACTIVITIES ARE RELATED AND CAN BE INTERLEAVED.

- DESIGN ACTIVITIES
  1) ARCHITECTURAL
  2) INTERFACE
  3) COMPONENT
  4) DATA STRUCTURE
  5) ALGORITHM
- PROG. & DEBUGGING
- DEBUGGING PROCESS

3) SW VALIDATION

SHOW SW CONFORM AND MEET REQS.
- CHECK, REVIEW, TEST

EXECUTE SYSTEM WITH TEST CASES

→ STAGES:
- COMPONENT
- SYSTEM
- ACCEPTANCE

PHASES:
GR. P. 32

4) SW EVOLUTION

- SW IS FLEXIBLE AND CAN CHANGE
- AS REQS CHANGE, ALSO SW SHOULD WITH THE BUSINESS.
- DOCUMENTATION BETWEEN DOC & EXEC. IS INCONSISTENT.

GR P. 34.

SCRUM
SE_03

- **DEFINITION** : 1
  - AGILE FOCUS ON DELIVER HIGH BUS. VALUE IN THE SHORTEST TIME.
  - BUSINESS SETS PRIOR.
  - 2-4 WEEK REAL WORKING SW.

- **PHASES** : 3
  GR. P. 21
  1) PR. BACKLOG.
  2) SPRINT BACKLOG
  3) SPRINT
  4) SHIPPABLE PRODUCT.
  5) DURING SPRINT DAILY MEETING

- **CHARACTERISTICS** : 2
  - SELF-ORGANIZED TEAMS
  - 2-4 WEEK SPRINTS
  - REQS IN LIST OF PROD. BACKLOG
  - AGILE MANIFESTO P. 11
  - PROJECT NOISE LEVEL P. 12

- **SPRINTS** : 4
  PROCESSES IN A SERIES OF SPRINTS
  2-4 WEEKS
  DESIGNED, CODED AND TESTED DURING SPRINT
  - NO CHANGES DURING SPRINTS
  - INSCRUM NOT ALL AT A TIME DEV. ABILITIES ON DURING SPRINT.
    GR. P. 23

- **SCRUM FRAMEWORK** : 5
  - **ROLES** :
    1) PROD. OWNER
    2) SCRUMMASTER
    3) THE TEAM
  - **CEREMONIES** (GR. P. 35)
    1) SPRINT PLANNING
    2) DAILY SCRUM.
    3) SPRINT REVIEW
    4) SPRINT RETROSPECTIVE
  - **ARTIFACTS** (GR. P. 45)
    1) PROD. BACKLOG
    2) SPRINT BACKLOG.
    3) BURNDOWN CHARTS

- **SCALABILITY** : 6
  TEAM : 7 ± 2 PEOPLE
  FACTORS : TYPE OF APP.
  TEAM SIZE
  TEAM DISTRIBUTION
  PROJ. DURATION
  - SCRUM OF SCRUM OF SCRUM ...

- **USER STORIES** : 7 3
  - BDD :- ASKS ABOUT BEHAVIOR BEFORE AND DURING DEV.
    - REQS WRITTEN AS USER STORIES
    - CONCENTRATES ON BEHAVIOR.
  - USER STORIES : WHO, WHAT, WHY
    1-3 SENTENCES
    3 x 5 CARDS
    EX. : AS A ...
    I WANT TO ...
    SO THAT ...
    - STORY POINTS : rating of effort.
  - MEASURE OF PRODUCTIVITY : 1) AVG. STORY / WEEK.
    2) AVG. POINTS / WEEK.
  - POINTS : - USE OF FIBONACCI SCALE,
    - TEAM VOTE TO ASSIGN POINT
    - ≥ 5 DIVIDE USER STORY
    PREFER STORY THAT ~~CROSS~~ LAYERS.
  - SMART STORIES :
    1) SPECIFIC
    2) MEASURABLE
    3) ACHIEVABLE (IMPL IN 1 ITERATION)
    4) RELEVANT (S'WHYS)
    5) TIMEBOXED (KNOW WHEN TO GIVE UP)
  - LO-FI UI
    PEN & PAPER
    EASIER THAN PROTOTYPING ; PROTO ARE EXP. IN TIME
  - STORY BOARDS
    USED TO SHOW HOW UI CHANGES based on user actions.

DIST. PROGRAMMING / SE_06

4

- LAYERS VS. TIERS : 1

3-LAYERS:
Client
↓
- PRESENTATION
- APP LOGIC
- DOS. MANAG.

I.S. DESIGN
- TOP-DOWN (ADV. / DRAWB.)
- BOTTOM-UP

I.S. ARCHITECTURE
- 1-tier
- 2-tier
- 3-tier
- N-tier

- MIDDLEWARE : 2

- DEFINITION
- COMM. PARA.:
  - BLOCKING INT. (SYNC.)
  - ENHANCED SUPP.
- GENEALOGY OF MIDDLEWARE
- RPC
- UNDERSTANDING MIDDLEWARE
- MIDD. AS A PROGR. ABSTRACTION
- " " INFRASTRUCTURE

- MOM : 4

- MESS. QUEUES
- PUBLISH/SUBSC.
  - TOPIC-BASED
  - CONTENT-BASED

SEE GR. P. 29

- TRPC : 3

- DEFINITION
- BOT & EOT
- 2-Phase

- MIDDLEWARE ON THE INTERNET : 5

- THE WEB ⟶ INFO EXCHANGED OVER HTTP
- HTTP MECHANISM ⟶ CLIENT/SERVER USING TCP/IP

GR. P. 31 (PROXY & FIRE WALL)
↳ PROXY, GATEWAY, TUNNEL ...

- 3-TIER ON THE WEB ⟶ GR. P. 32
  SUPPORT FOR REMOTE CLIENTS
- APPLETS
- COMMON GATEWAY INTERFACE + Graphs.
- SERVLETS

SE_05 WEB SERVICES

- WEB SERVICES TECH STACK
- QoS → ABILITY TO RESPOND TO ALGORITHMIC INVOCATIONS
- SLA's → FORMAL AGREEMENT (CONTRACT)
- IMPACT OF WEB SERVICES → STANDARDS...

- S-O paradigm : 0

Utilizes services as the constructs
New approach to programming based on discover and invoke web-available services

- WHAT ARE? : 1

- OOF → EX. P. 6
- ASP → SW AS-A-SERV.
- ASP VS. WEBSERVICES + GRAPH P. 8
- "Used within an enterprise"
- "and between enterprises".
- TYPES → INFORMATIONAL - COMPLEX
- PROPERTIES AND STATES: FUNCT. / LOW-FUNCT. / STATEFUL / STATELESS
- LOOSE COUPLING - GRANULARITY
  - CONNECT FREELY
  - SMALL INTERACTIONS WITH CLIENT NECESSARY.
- SYNCHRONICITY & WELL-DEFINEDNESS
  - SYNCHRONOUS OR RPC-STYLE
  - ASYNCHRONOUS OR MESSAGE-STYLE
  - The service interaction must be well-defined.
- SERVICE INTERFACE & IMPL.
- SERVICE DEPLOYMENT VS. SERVICE REALIZATION
  - ROLES: 1) SERVICE PROVIDERS 2) – CLIENTS 3) – REGISTRY
- S-O Architecture

- e-SERVICES: 6

- OBF.
- CONDITIONS.
- e-SERVICES & WS.

- RESTFUL SERVICES! 5

- RESTFUL SERVICES intro + tab. p. 56
- PRINCIPLES : 5
- EXAMPLE p. 59
- MATURITY OF RESTFUL Services. : 4
- REST VS. WS (or notion).

- REGISTRY AND UDDI: 4

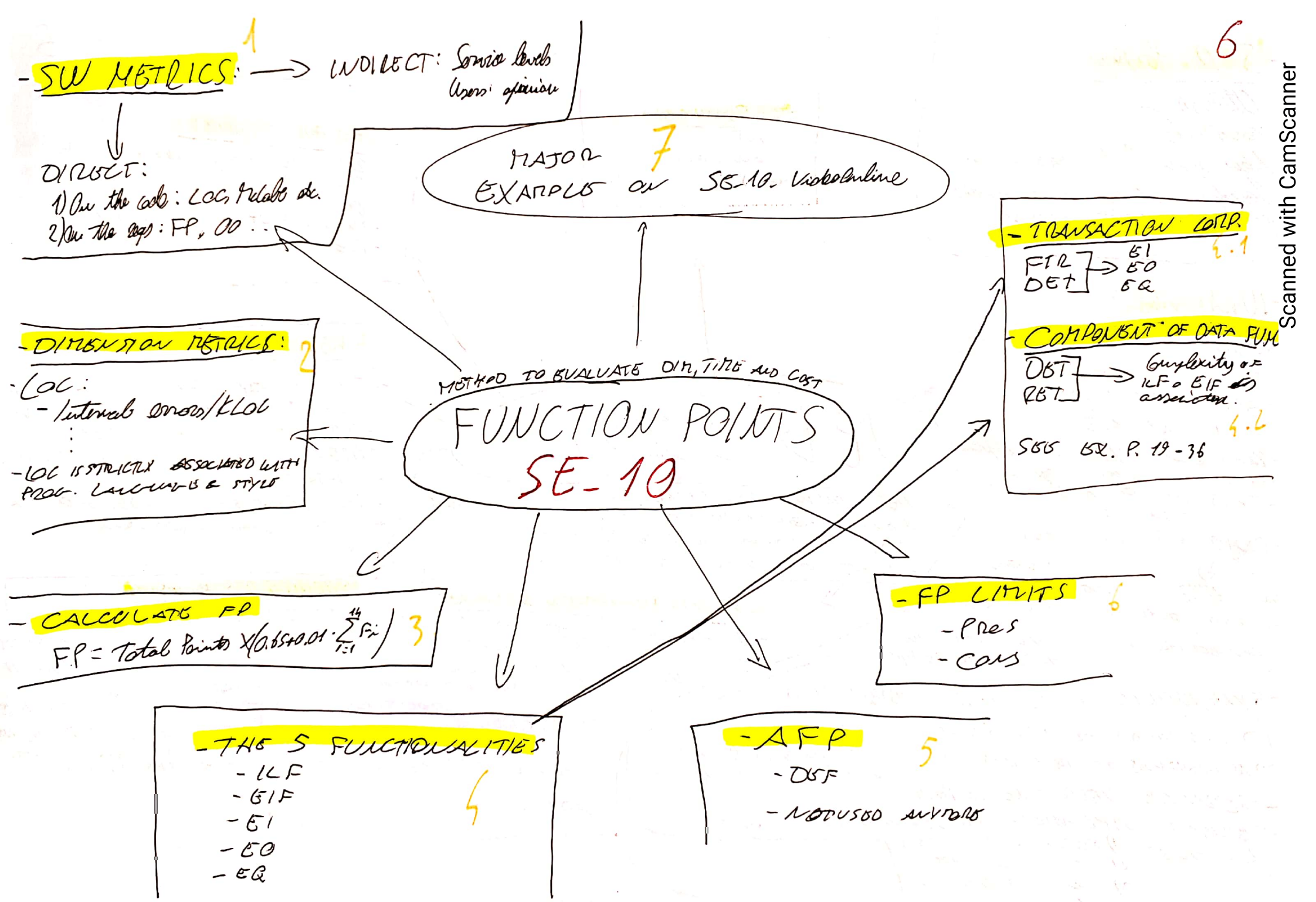
- SOA between actors: S. REQ ↔ S. PROV.
- WHAT IS UDDI? → REGISTRY STAN FOR WS. enables...
- UDDI & WSDL GR. p. 46
- PITFALLS OF WS → CAUSED BY COMPLEXITY
- S. MASHUPS
- STACK OF ~~WEB~~ TECH VS. WSDL-BASED STACK
- RESTFUL Services intro + TAB. p. 56
- REST

- SERVICE DESC & WSDL: 3

- TO DISCOVER EASILY WS.
- SERV. DESC.: REDUCES UNREALISTIC POS.
- WSDL: DESCRIBES THE INTERFACES
  - AS A CONTRACT
  - STRUCTURE → SER-IN DEF / SER IMPL PART
  - DOCUM. CONTENT
  - MESSAGE EXCHANGE PATT.
  - GRAPHS PP. 40-42

- COMMUNICATION & SOAP: 2

- To solve ~~proprietary~~ systems on heterogeneous infr. → WS on SOAP.
- What is SOAP? → STAND. FOR WS FOR INTERAPP COMM.
- COMM. MODEL → RPC-STYLE / DOCUMENT(MESS.)-STYLE
- SOAP & HTTP: BINDING; GET/POST...
- ADV. & DISADV.



EFFORT ESTIMATION
SE_11 (cocomo)

- STEPS: 1
  - Reqs → FP
  - FP → LOC
  - LOC → Time/Effort
  - Effort → Cost
  - Overview P.4

- BACKFIRING: 5
  - HOW TO MOVE FROM THIS FP TO LOC

- LOC ESTIM. 6
  - SLOC WITHIN COCOMO SW

- COCOMO II: 3
  - EST. PRECISION P.22
  - MODELS: 1) EARLY-DESIGN 2) POST-ARCHIT.
  - FORMULAS: PM ..., Calibration
  - SCALE FACTORS: very low, ..., Extra high
    - PREC
    - PMAT
    - → 1) PRECEDENTEDNESS & DEV FLEXIB.
    - 2) ARCHITECTURE/RISK RESOLUTION
    - 3) TEAM COHESION
    - 4) PROCESS MATURITY
  - KPA IMPL. %
    - Key Process Area
  - EFFORT MULTIPLIERS:
    - PRODUCT
    - SYSTEM
    - PERSONAL
    - PROJECT
  - 7 VS 17

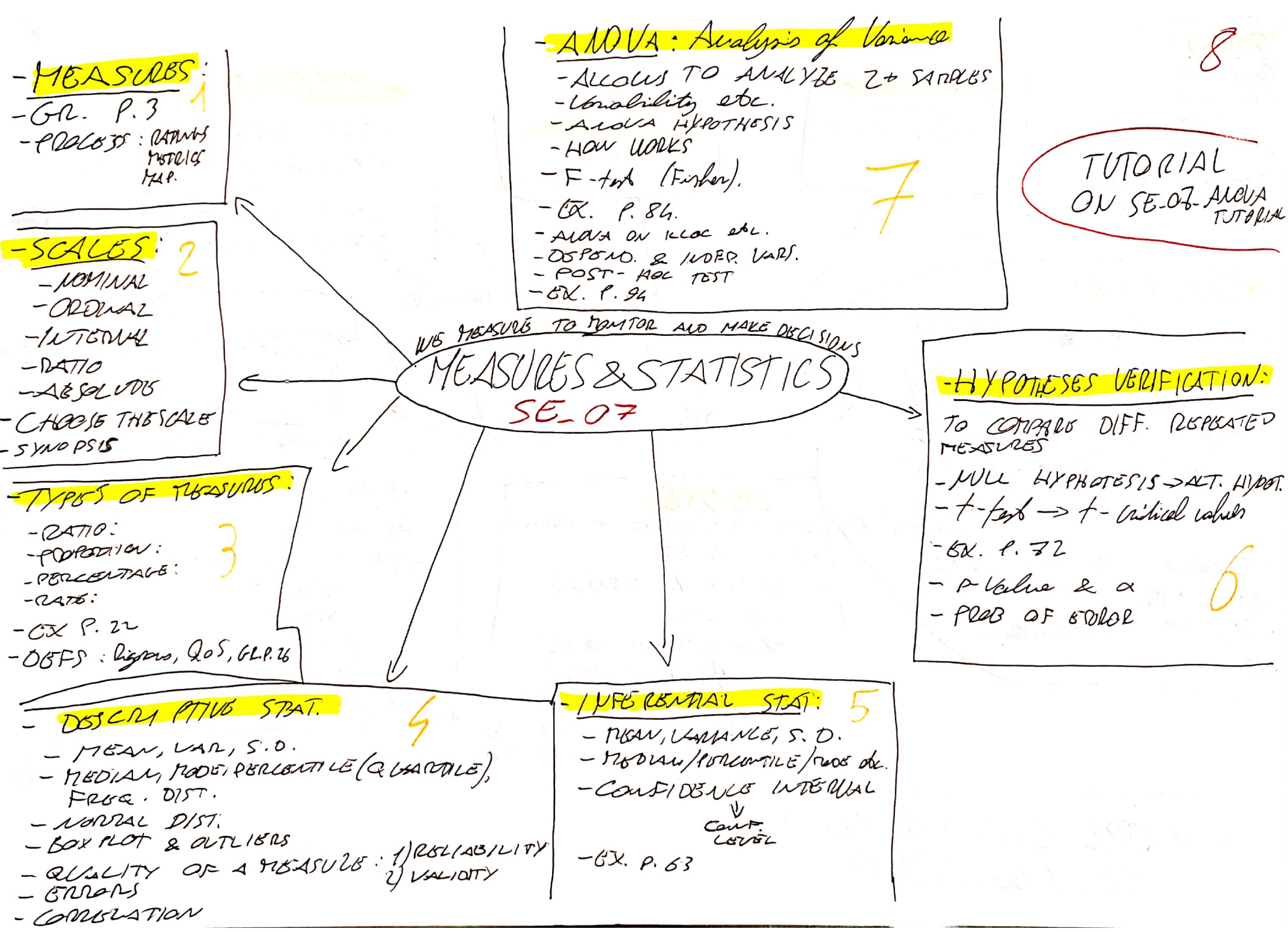
- COCOMO: 2
  - LOC + Proj. Par. → COCOMO
  - Type of proj I want to follow
  - EFFORT ESTIMATION FROM LoC: based on Cocomo: Quadratic cost model
    - Characteristics (M&T)
  - Cocomo FORMULAS P. 12
  - EX. P. 14
  - M e T distributions
  - CALTD

- REUSE 4
  - ESTIMATE THE EFFORT TO REUSE
  - CR. P. 50
  - COCOMO II REUSE:
    - ESLOC
    - NEW LINEAR MODEL:
      - 1) ADAPTING SW: SU, AA, UNFM
      - 2) % OF MODIF.: AAF, DM, CM, IM.

REQS → Cost, Effort, Time

NUM. VALUES

MAJOR EXAMPLE IN SE_11bis-CocNoEx


8
- MEASURES: 1
- GR. P. 3
- PROCESS: RATIONS METRICS MAP.
- ANOVA: Analysis of Variance
- ALLOWS TO ANALYSE 2+ SAMPLES
- Variability etc.
- ANOVA HYPOTHESIS
- HOW WORKS
- F-test (Fisher).
- EX. P. 84.
- ANOVA ON ILOC etc.
- DEPEND. & INDEP. VARS.
- POST-HOC TEST
- EX. P. 94
7
TUTORIAL ON SE-07-ANOVA TUTORIAL
-SCALES: 2
- NOMINAL
- ORDINAL
- INTERVAL
- RATIO
- ABSOLUTE
- CHOOSE THE SCALE
- SYNOPSIS
WE MEASURE TO MONITOR AND MAKE DECISIONS
MEASURES & STATISTICS
SE_07
-HYPOTHESES VERIFICATION:
TO COMPARE DIFF. REPEATED MEASURES
- NULL HYPHOTESIS → ALT. HYPOT.
- t-test → t-critical values
- EX. P. 72
- p-value & α
- PROB OF ERROR
6
-TYPES OF MEASURES:
- RATIO:
- PROPORTION:
- PERCENTAGE:
- RATE:
- EX P. 22
- OBJS: Rigour, QoS, GLP.26
3
- DESCRIPTIVE STAT.
- MEAN, VAR, S.D.
- MEDIAN, MODE, PERCENTILE (QUARTILE), FREQ. DIST.
- NORMAL DIST.
- BOX PLOT & OUTLIERS
- QUALITY OF A MEASURE: 1) RELIABILITY 2) VALIDITY
- ERRORS
- CORRELATION
4
- INFERENTIAL STAT: 5
- MEAN, VARIANCE, S.D.
- MEDIAN/PERCENTILE/RANGE etc.
- CONFIDENCE INTERVAL
↓
CONF. LEVEL
- EX. P. 63