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* Software Construction:- referes to the detailed creation of working Software through a Compination of Coding verification, unit testing, integration testing, debugging

(KAs) Knowledge Area

[Software Requirements, Software Construction, Software Testing, Software engineering Management, Software Configuration Management. → 12

KA linked to all other KAs, but it is most strongly linked to [Software Design, Software Testing] (why ??)

[Software design, Testing] لأن Software construction process بتشتغل كتير بيشتغل

↙ output ↓ input

← KA فاتقوش [software design, Testing] ة الحالات

activities.

[Construction, software design, Testing * حدود فواستخدام

lifecycle process يتحدد على حسب

Construction prior to design لها الاولوية لذا،

KA

[design] work is performed during the Construction activity

[Testing] KA

Software engineers Test unit, integration Test test their work

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Information Required for processes such as Maintenance, support, saftey

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KA

Software Configuration Management

Software Construction produces The highest number of (Configuration items) that need to be managemed in a software project (Source files, documentation, Test Case ---).

حاجة ممكن تتغير لتشكل مستقل

1- operating system.
2. physical Machine.
3- File → (Configuration file) → How application is Run in your Computer
4- API → Technical Interface

developer → change setting file without Recompile APP

Software Quality Important in all the KAs.

Computer foundations KA (algorithms, Coding practices)

design, Construction of software products)

project Management — وأيضا

Management of Construction Can present Considerable challenges].

* BREAKDOWN OF TOPICS FOR Software Construction:-

* Software Construction Foundmentals
  1- Minimizing Complexity
  2- anticipating change
  3. Constructing For Verification.
  4- Reuse.
  5. standards in construction.

(1–4 bracketed with arrows:) design as well as construction

1- minimizing Complexity:- عدم قدرة الانسان على أحمل المعلومات اكثيرة.

1- creation of Code is simple and readable rather than clever.

2. Making use of standards [Requirement Validation, analysis, process, specification].

3- Modular Design [Construction Design]

4- numerous other specific Teqniques [coding].

5- Construction - Focused Quality.

2- anticipating change [code]

Most software change overtime

1- change environment

build (extensible Software) ← software engineers بتعمله

enhance software product without distrupting the underlying structure.

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3- Construction For Verification:-

get Faults by Software engineers writting The Software as well as tester, user [Code view, unit testing, organizing code to automated testing, Hard To understand among other].

(أول شيء → user)

4- Reuse:- → using different existing assents in Solving different problems.

استخدام حاجات مستخدمة قبل كدة ذي

→ Source code - COTS (Commercial off-the-shelf libraries.

→ best ~~practiced~~ practiced systematically

Productivity - quality - Cost Improvement.

with reuse	For reuse
reuse Software assents for a new solution	Create reusable software.

5- Standards in Construction:-

internal — external developement

- Cost. - Quality, efficiency, عشان أحقق

achieving security

1- Communication Method (standard for document formats and contents.) عن

2. language

3- Coding standard.

4- platform (interface standard for operating system Call).

5- tools (diagram, UML

← unified modeling language.

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For use in specific project

external	internal Standard → 4
use external standard for (Construction language)	1- minimizing Complexity
1. Construction tool	2_ anticipating change.
2. technical interface.	3- Constructing for verification.
3. interaction between KA → KAS	4- activities.
	, use for specific projects
OMG (object Management group). ← software interface. ISO, IEEE International organization	

*Management Construction:- → Construction life-cycle in models ←

Numerous Model created to develop software

1-Construction in life Cycle Models:-

→ iterative models	linear model (وتأكد الأنشطة التنسيق construction)
mix (design- Code -test)	Construction an activity
Construction activity بيعملها زي	بعد ما يخلص الحل الاول كله
	included detailed requirements
→ Compination of activities as Construction	detailed planning
	extensive design work / planning
	بيهتم بال activities اللي بتيجي قبل construction (Design, requirements) ↓ coding activity بيعرض وتحتها
→ agile develop	
→ evolutionary prototyping.	waterfall, Staged- delivery life cycle Model.

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2- Construction planning

١- اختيار construction Method هو الاساس فلازم اخلص قبل ما ابدأ في Construction ← بيأثر على كل المبادئ بتاعة حزة واحد.

٢- وبيهتم ايضا ازاى Components اكونت و اتجمعت
example:- (incremental integration)

Software Quality - Management processes,
The allocation of Task → Method اى تاسك مختص!

3- Construction ~~Management~~ Measurement:-
Measured - including Code developed, Code Modified, Code Reuse, Code destroyed, Code Complexity, Code inspection, Fault fix, Fault Find

* practical Considerations:-

World Constraints وعليها مؤثرات → Construction
عشان كده هو اكتر حاجة practical Considerations

1- Construction Design:-
(KA) Software Design على design activity لصراحة بتأثر
Construction Design بيأثر برضه على
← Smaller- Scale modifier →(يدخل) un anticipated gap.
ذكى مثلا learning الامور.

1

reliability نقاط ضعف احترام

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Construction language:- Finite state

Construction + Implementation (Compiler)

* Configuration language:- Text_based Configurated files used in unix, windows

menu_style selection → Some program create Construction.

application programming language

Toolkit language 1- مبناء البرامج معتمد على Toolkit معين
زي nltk toolkit

2. More Complex than Configuration language.

Scripting language:- batch files (Macros) used application programming language

Programming language:- Most Feasible Type of construction language.

(information about specific application.) develope ment process — أكتر لغة تشمل — Kind of notation

linguistic	Formal	visual
Textural string استخدام النص	أقل على اليد بعض	تخيل استخدام
تركز في pattern	String صحة الكلمات	graphical
Sentence like syntax	More → definitions	representation
semantic عند بيعه مرات	definition backed	
قوى ... زاوية عشان	upon by precision	
يشوف يستطيع ابن وقت الاستخدام	on ambiguity	
(ذكاء عالي)	semantic base of Most Form	

System program
ambiguity natural.

sema
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***Coding :-** → apply To Software construction coding activity :-

1- create understandable source code [Naming Conventions, source code layout].
2- use Control structure.
3- use classes, variables named Constants,
4- Handling error.
5- prevent of Code level security.
6- Thread, databaselock التوازى بالاستخدام
7- Source Code organization(oop).
8- Code documentation.
9- Code Running. * الزمن التكاليف الزيادة وأقللها.

gab
Construction Testing between الفرق بين الـ ... وهو موجود في الكود أقلل ال Test
داما اكتشف امتى ازاى الكود

unit testing | integration testing

***Construction for reuse**

Create Reusable Software (Libraries, Compont).

Construction with reuse

Create new software with The use of existing software
→ application with opensource library
off-the-shelf
better of same Quality
as newly devel

أحمد الطحاوي With You Step By Step

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Construction Quality

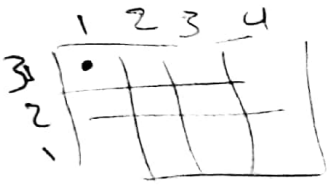
Faults ← design + Requirement
↓
Construction → low Quality or security.
Numerous Tequiques as it is Constructed
1- unit _ integration Testing
2- test - First developement.
3. inspection.

Integration

١- ايه الاجزاء الى اعملها integration
٢- درجة الـ Test الى هعملها و وقت المنتج قبل مايتجمع او بعده.
٣- Creating Scaffolding To support interim versions of the software.
٤- استوق الـ points الى الـ Test المـوقف softwares تعبه

Phased integration	incremental
[big bang] → يأجل التجميع لغاية لغاية ما كل جزء اشتغل في version تباعه.	write test program in small peeieses, اجمعهم بعدين 1- error location 2- improve progress. 3. Monitoring earlier product delivery. 4. Improve Customer relation.

incremental Integration :- building and integration one unit at a time.



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Construction technologies :-

API Design and use :-

application programming interface (API)

Software Analysis { FindBugs ← PMD ← case checkstyle ←