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Software Design   Software Architecture

What is the difference between software architecture and design?

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6 Answers

Thomas Owens, BS Software Engineering, 5+ years experience as a software engineer
Answered Mar 12

The SEI has a fact sheet with different definitions of software architecture from a number of different sources. Personally, I favor the definition from the Rational Unified Process (which is included in the fact sheet linked to previously):

> An architecture is the set of significant decisions about the organization of a software system, the selection of the structural elements and their interfaces by which the system is composed, together with their behavior as specified in the collaborations among those elements, the composition of these structural and behavioral elements into progressively larger subsystems, and the architectural style that guides this organization---these elements and their interfaces, their collaborations, and their composition.

Architecture is design, but not all design is architecture. There is a subset of design decisions that are very important to a software system. These are things that are very difficult to change or evolve once they have been made. This subset of design decisions reflects the architecture of the system.

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John Scattergood, Experienced software architect
Answered Feb 12, 2016

There is a famous saying that "all architecture is design, but not all design is architecture".

Architecture is the part of design that deals with the aspects that are difficult to change such as the technology choices, application/system structure, trade-offs between quality attributes, how and where data is stored, deployment and runtime properties.

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It should also be mentioned that all software has an architecture even if it wasn't intentionally designed.

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[avatar] **Dominique Basson**, Senior Software Architect
Answered Feb 13, 2016

Architecture is design. However, the distinction usually is that the architecture deals with the bigger picture. Breaking down your design into modules or components, designing interfaces, and describing how the modules interact to achieve your requirements.

An architecture typically is based on the 'architecturally significant requirements', which are often so called non-functional requirements, which provide the basic structure upon which your software is built.

'Design' would then be the implementation of the architecture where you turn the architecture into code.

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[avatar] **Chuck Cobb**, Agile Project Mgt Author and Instructor (Over 50K Students)
Answered Mar 3

"Design" is a very general term that includes all aspects of decisions related to how software is structured and developed. "Architecture" is a specific aspect of design that deals with the high-level structure of software and higher-level patterns of design that might be used in implementing the design.

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[avatar] **Nishanth Bhaktula**, Software Engineer
Answered Apr 21, 2014

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Software Architecture is the skeleton of a software. When we try to come up with a software architecture, we brainstorm to figure out the modules(at a higher level) which comprise the software and define what the functionality of each module should be. We don't deal with how the functionality of a module should be implemented.

Software Design deals with how a particular module should be implemented? What design pattern should be used to implementing it? in order to receive the inputs(in case if there are any) and send out the result(if there is any) to another module as per the planned architecture.

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Ravindra Mahajan, Software design tools developer.
http://flow.oodupinc.com/
Answered Mar 4

I will answer this question using the analogy of building architecture. An architect would draw the sketch of the layout of the building typically floor plans, elevations etc i.e. he will specify all the functional and aesthetic details but he will not specify the implementation details of the building such as structure type (load bearing or RCC or steel frame), wall thickness, the type of bricks etc. The implementation details are provided by the civil engineer who provides the structural design. Similarly, a software architect would define the elements . their functionality , and their interrelationships. In short, architect will specify the **functional environment** of each method. Taking this functional environment, test engineer could define the test cases. A software development team could take these architectural specifications and design the software using a procedural or functional or object-oriented or embedded paradigm.

So a software architect would specify the functional elements independent of implementation details and a software designer would specify the implementation details like paradigm, memory structures etc.

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We talk a lot about AI and machine learning here at work and I think the common themes that come out of this are this:

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