



What is the difference between "compile time" and "run time"?

Asked 14 years, 6 months ago Modified 1 month ago Viewed 21k times




12

I do not understand what is meant by the terms "compile time" and "run time" (or "runtime").

I'm also a bit confused about what "value type" and "reference type" mean, and how they relate to the 'times mentioned above.



Would someone please explain these things?

[.net](#) [definition](#)

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edited May 16, 2013 at 6:38



[Carsten](#)

11.4k 7 42 64

asked Oct 5, 2009 at 10:25




[Surya sasidhar](#)

30k 58 141 221


6 Answers

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23

"Compile time" is when you build your code - when the compiler converts your source code into IL.

"Runtime" is when your code is executed - for ASP.NET, when a page request is made. (Personally I prefer the term "execution time" to distinguish between that and "the Common Language Runtime (CLR)" - aka the virtual machine.)



Value types and reference types are an entirely separate concept, but I have [an article](#) about them which you may find useful.

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answered Oct 5, 2009 at 10:27



[Jon Skeet](#)

1.5m 878 9.2k 9.3k

what i have to say is for value type memory allocated at compile time and for reference type memory allocated at runtime – [Surya sasidhar](#) Oct 5, 2009 at 10:50

@Surya: No, that's not true at all. They're completely separate concepts - don't try to put them together. – [Jon Skeet](#) Oct 5, 2009 at 11:06

ok ok jon skeet i understood. can u send any material for c# basic things like what is class,encapsulation,abstraction,inheritance,delegates like that i want basics of c# this is my id

suryasasidhar@yahoo.co.in – [Surya sasidhar](#) Oct 5, 2009 at 11:134 Do not ask here to send any material to your email id. Better ask for some link. – [rahul](#) Oct 5, 2009 at 12:43This helped after 3 Years. Thanks. With love from Pakistan. – [Yousuf Memon](#) Apr 26, 2013 at 2:30

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A variable that is a value type, stores the data, while a variable of a reference type stores a reference to the data.



In computer science, [compile time](#) refers to either the operations performed by a compiler (the "compile-time operations"), programming language requirements that must be met by source code for it to be successfully compiled (the "compile-time requirements"), or properties of the program that can be reasoned about at compile time.

The operations performed at compile time usually include syntax analysis, various kinds of semantic analysis (e.g., type checks and instantiation of template) and code generation.

In computer science, the qualifier [run time](#), run-time, runtime, or execution time refers to the period while a computer program is actually executed ("run") in a computer, from beginning to termination. It may also mean the program's running time, the duration of that period.

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edited Oct 5, 2009 at 10:34

answered Oct 5, 2009 at 10:27

[rahul](#)

186k

49

236

264

1 Value types aren't always stored on the stack. See pobox.com/~skeet/csharp/memory.html – [Jon Skeet](#) Oct 5, 2009 at 10:29



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Value type variable means variable who can store its own value directly.
Reference type variable means variable who store reference (i.e.address of value) of their value instead of storing value directly.



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edited May 16, 2013 at 6:45

answered May 16, 2013 at 6:34

[Roelf](#)

7,523

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44

67

[vinod dhekane](#)

11

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As to your first question, see [Stack Overflow: Runtime vs Compile time](#).

As to your second question, see [Stack Overflow: What are the differences between value types and reference types in C#](#).



As to how they relate: they are independent concepts. Setting a variable's value and reading its value happens at run time; whether or not that variable has value type or reference type.



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edited May 23, 2017 at 11:52

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2 revs

David Cary



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Compile-time is the time at which the source code is converted into an executable code while the runtime is the time at which the executable code start running. For more details check out this link below: <https://www.javatpoint.com/compile-time-vs-runtime>



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answered Apr 7, 2023 at 11:48



Charles Arko-Clayman

286 2 7



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Compile Time: When code is translated into machine-readable instructions. Syntax errors are detected.



Run Time: When compiled code is executed. Dynamic behavior occurs.



Value Type: Directly stores data. Values often known at compile time (e.g., primitive types).

Reference Type: Stores references to data. Objects typically created and manipulated at runtime.

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edited Mar 14 at 14:24

answered Mar 13 at 23:04



Soleil

6,792 6 43 65



Hamza Saghir

1 1

"When code is translated into machine-readable instructions." - that is not correct (by default, if we don't account for stuff like Native AOT) for C#/ .NET. IL is not machine-readable it requires .NET runtime/JIT compiler to be turned into actual runnable instructions. – [Guru Stron](#) Mar 15 at 23:09

"Values often known at compile time" - that is also can be considered quite a bold statement) – [Guru Stron](#) Mar 15 at 23:13



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