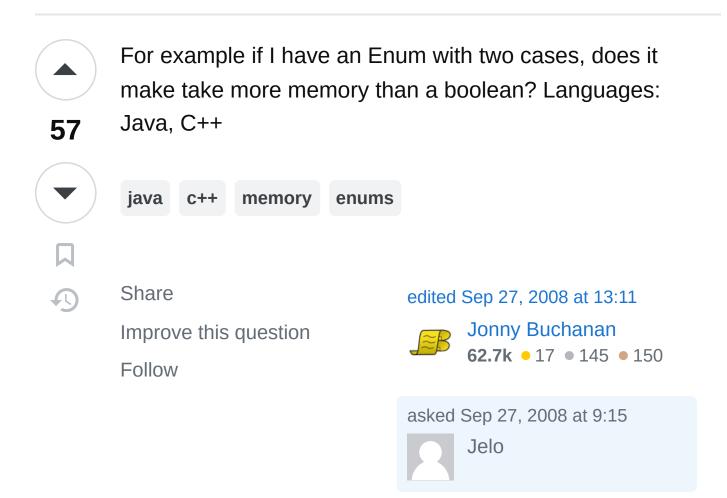
How much memory do Enums take?

Asked 16 years, 2 months ago Modified 13 years, 3 months ago Viewed 37k times



12 Answers

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In Java, an enum is a full-blown class:

55



Java programming language enum types are much more powerful than their counterparts in other languages. The enum declaration defines a





class (called an enum type). The enum class body can include methods and other fields.

In order to see the actual size of each enum, let's make an actual enum and examine the contents of the class file it creates.

Let's say we have the following constants enum class:

```
public enum Constants {
   ONE,
   TWO,
   THREE;
}
```

Compiling the above enum and disassembling resulting class file with javap gives the following:

```
Compiled from "Constants.java"
public final class Constants extends java.lang.Enum{
   public static final Constants ONE;
   public static final Constants TWO;
   public static final Constants THREE;
   public static Constants[] values();
   public static Constants valueOf(java.lang.String);
   static {};
}
```

The disassembly shows that that each field of an enum is an instance of the constants enum class. (Further analysis with javap will reveal that each field is initialized by creating a new object by calling the new constants(String) constructor in the static initialization block.)

Therefore, we can tell that each enum field that we create will be at least as much as the overhead of creating an object in the JVM.

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edited Aug 28, 2011 at 4:52

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answered Sep 27, 2008 at 9:23



- On 32-bit platforms, it'll be exactly the same size as an int it's just a (32 bit) pointer to the enum instance. Only one instance of each enum value exists in memory.
 - thenickdude Feb 3, 2010 at 23:42
- 4 -1 "a little bit more heavier than a plain integer"? What does that mean, and where do you get that from the text?
 - Erick Robertson Aug 11, 2011 at 17:38



In Java, there should only be one instance of each of the values of your enum in memory. A reference to the enum then requires only the storage for that reference.



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Checking the value of an enum is as efficient as any other reference comparison.



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answered Sep 27, 2008 at 10:18

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8

bool might be implemented as a single byte, but typically in a structure it would be surrounded by other elements that have alignment requirements that would mean that the boolean would effectively be occupying at least as much space as an int.



Modern processors load data from main memory as a whole cache line, 64 bytes. The difference between loading one byte from L1 cache and loading four bytes is negligible.

If you're trying to optimise for cache lines in a very highperformance application, then you might worry about how big your enum is, but generally I'd say it's clearer to define an enum than to use a boolean.

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answered Sep 27, 2008 at 10:10





8

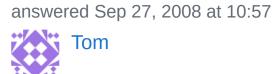
You would only worry about this when storing large quantities of enums. For Java, you may be able to use an EnumSet in some cases. It uses a bit vector internally which is very space efficient and fast.



http://java.sun.com/j2se/1.5.0/docs/api/java/util/EnumSet. html



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4



In Java, it would take more memory. In C++, it would take no memory than required for a constant of the same type (it's evaluated at compile-time and has no residual significance at runtime). In C++, this means that the default type for an enum will occupy the same space as an int.



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answered Sep 27, 2008 at 9:27





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In ISO C++ there is no obligation for an enum to be larger than its largest enumerator requires. In particular, enum {TRUE, FALSE} may have sizeof(1) even when sizeof(bool)==sizeof(int). There is simply no requirement. Some compilers make the enums the same size as an int. That is a compiler feature, which is allowed because the standard only imposes a minimum. Other compilers use extensions to control the size of an enum.

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answered Sep 29, 2008 at 12:50



MSalters

179k • 11 • 164 • 368

I think most use the native size for the CPU architecture. 32-bit aligned data is fast to retrieve for most 32-bit CPUs, so most types end up as multiples of 32 bits. – gbjbaanb Oct 19, 2008 at 18:48



printf("%d", sizeof(enum));

2

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answered Sep 27, 2008 at 9:30



Patrick **92.4k** • 11 • 52 • 61







In C++ an enum is typically the same size as an int.

That said it is not uncommon for compilers to provide a command line switch to allow the size of the enum to be set to the smallest size that fits the range of values defined.

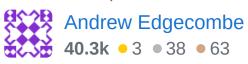


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answered Sep 27, 2008 at 23:29

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No, an enum is generally the same size as an int, same as boolean.

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answered Sep 27, 2008 at 9:18









It could, hence 'generally'. If someone is asking such a question without further details, though, edge cases like that are rarely important. – Serafina Brocious Sep 27, 2008 at 9:24

The Java and C++ tags indicate that this comment contains the correct answer in this context. – Jeffrey L Whitledge Sep 27, 2008 at 13:22

OK, on further research, it appears the answer for Java is not correct. (OT: It is the same as an int in C#, though.)

- Jeffrey L Whitledge Sep 27, 2008 at 13:28

In C++ enum and int same. bool and char same. – Loki Astari Sep 27, 2008 at 18:50



0





If your enum will ever have only two cases, indeed using a boolean instead might be a better idea (memory size, performance, usage/logic), even more in Java.

If you are wondering about memory cost, it might imply

If you are wondering about memory cost, it might imply you plan to use lot of them. In Java you can use BitSet class, or on a smaller scale, in both languages you can manipulate bits with bitwise operations.



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answered Sep 27, 2008 at 9:35





0



sizeof(enum) depends upon what you have in the enum. I was recently trying to find the size of an ArrayList() with default constructor params and no objects stored inside (which means the capacity to store is 10). It turned out that ArrayList is not too big < 100 bytes.



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So, sizeof(enum) for a very simple enum should be less than 10 bytes. you can write a small program, give it a certain amount of memory and then try allocating enums. you should be able to figure it out(that's how i found out the memory of ArrayList)

BR,

~A

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answered Sep 27, 2008 at 18:14





In C/C++ an enum will be the same size as an int.





With gcc you can add **attribute**((packed)) to the enum definition to make it take the minimum footprint. If the largest value in the enum is < 256 this will be one byte, two bytes if the largest value is < 65536, etc.





typedef enum {
 MY_ENUM0,
 MY_ENUM1,
 MY_ENUM2,
 MY_ENUM3,
 MY_ENUM4,

```
MY_ENUM5
} __attribute__((packed)) myEnum_e;
```

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edited Sep 28, 2008 at 3:39

answered Sep 28, 2008 at 3:18



I am fairly sure __attribute__((packed)) is a GCC-only extension. If I remember correctly, C99 does not specify a standard pragma for "packing", so every compiler does it differently. – Michael Ratanapintha Sep 28, 2008 at 3:29

You're probably right. It was my recollection that packed was a C99 feature, but my memory is often cantankerous and uncooperative. I removed the C99 reference. – DGentry Sep 28, 2008 at 3:39