### Ruby master - Bug #7844

**include/prepend satisfiable module dependencies are not satisfied**

02/13/2013 10:55 PM - mame (Yusuke Endoh)

<table>
<thead>
<tr>
<th>Status:</th>
<th>Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority:</td>
<td>Normal</td>
</tr>
<tr>
<td>Assignee:</td>
<td>matz (Yukihiro Matsumoto)</td>
</tr>
<tr>
<td>Target version:</td>
<td></td>
</tr>
<tr>
<td>Backport:</td>
<td>2.7: REQUIRED</td>
</tr>
</tbody>
</table>

**Description**

Hello,

```ruby
module P
  def m; puts "P"; super; end
end

module Q
  def m; puts "Q"; super; end
  include P
end

module R
  def m; puts "R"; super; end
  prepend Q
end

module S
  def m; puts "S"; super; end
  include R
end

class A
  def m; puts "A"; super; end
  prepend P
  include S
end
A.new.m #=> P, R, A, S, Q
```

This code has five module dependencies, but only two are satisfied.

- Q includes P, which is not satisfied: P#m precedes Q#m.
- R prepends Q, which is not satisfied: R#m precedes Q#m.
- S includes R, which is not satisfied: R#m precedes S#m.
- A prepends P, which is satisfied: P#m precedes A#m.
- A includes S, which is satisfied: A#m precedes S#m.

Note that all the dependencies can be satisfied at all:

```ruby
A.new.m #=> Q, P, A, S, R
```

---

Yusuke Endoh mame@tsg.ne.jp

**Related issues:**

- Related to Ruby master - Bug #14704: Module#ancestors looks wrong when a modu... Closed
- Related to Ruby master - Bug #17423: 'Prepend' should prepend a module before... Closed
- Related to Ruby master - Bug #18064: Backport fix for bug 7844 (include/prepe... Closed

**Associated revisions**

Revision 08686e71 - 11/20/2020 11:26 PM - jeremyevans (Jeremy Evans)

Do not allow Module#include to insert modules before the origin in the lookup chain

Module#include should only be able to insert modules after the origin, otherwise it ends up working like Module#prepend.

03/25/2022 1/4
This fixes the case where one of the modules in the included module
chain is included in a module that is already prepended to the receiver.

Fixes [Bug #7844]

Revision eeabac4c - 11/24/2021 07:47 AM - PikachuEXE (Pikachu Leung)
Do not allow Module#include to insert modules before the origin in the lookup chain
Module#include should only be able to insert modules after the origin,
otherwise it ends up working like Module#prepend.

This fixes the case where one of the modules in the included module
chain is included in a module that is already prepended to the receiver.

Fixes [Bug #7844]

Backport of https://github.com/ruby/ruby/pull/3796 to 2.7

History

#1 - 02/13/2013 11:23 PM - matz (Yukihiro Matsumoto)
I believe the behavior is undefined (or implementation defined) when module dependency has contradiction.
And preferably error should be raised when contradiction detected.

Matz.

#2 - 02/13/2013 11:38 PM - mame (Yusuke Endoh)
matz (Yukihiro Matsumoto) wrote:
I believe the behavior is undefined (or implementation defined) when module dependency has contradiction.
And preferably error should be raised when contradiction detected.

Thank you, I agree with the policy.

However, is there any 'contradiction' in this case? No pair of these dependencies conflicts. There are no cycles.
Actually, they are satisfiable. A solution can be found by using the topological sorting.

--
Yusuke Endoh mame@tsg.ne.jp

#3 - 02/15/2013 01:25 AM - marcandre (Marc-Andre Lafortune)
As I stated before (#1586), I feel that the solution is easy:

A.ancestors = [*A.prepended_modules.flat_map(&:ancestors), A, *A.included_modules.flat_map(&:ancestors), *A.
superclass.ancestors]

In the given example, this would be:

P, A, S, Q, P, R, Object, Kernel, BasicObject

It makes absolutely no sense to me that R could come before A and believe it is clearly a major problem. R is never prepended, nor included in a
prepended module!

Matz: how would you explain that R can be called before A in that example?

#4 - 05/31/2014 03:30 PM - nobu (Nobuyoshi Nakada)
- Description updated

#5 - 12/25/2017 06:15 PM - naruse (Yui NARUSE)
- Target version deleted (2.6)

#6 - 08/08/2019 05:09 PM - jeremyevans0 (Jeremy Evans)
- File include-after-origin-7844.patch added

This is still a bug in the master branch. I think the main problem in this example is that when calling Module#include, you can get a module inserted
before the receiver in the lookup chain instead of behind the receiver.
mame correctly pointed out that using a topological sort you can satisfy all dependencies in the example. However, you can only do so by inserting a module before the receiver in the lookup chain, which I don't think should be allowed.

In the example, at the time A.include S is called:

A.ancestors #=> [P, A, Object, Kernel, BasicObject]
S.ancestors #=> [S, Q, P, R]

In my opinion, Module#include should have these properties:

1. It should not add a module to the receiver's lookup chain if it already exists anywhere in the receiver's lookup chain
2. It should not move the position of any module in the receiver's lookup chain, only add modules to the receiver's lookup chain
3. It should not insert any modules before the receiver in the receiver's lookup chain
4. It should insert all modules as a group, not some modules in the receiver's lookup chain at a different place than other modules

Applied to this example, assuming the above properties, after A.include S, we should have the following:

A.ancestors #=> [P, A, S, Q, R, Object, Kernel, BasicObject]

In this example, P in the included module lookup chain is ignored as it is already in the lookup chain for A. The remaining modules in the included module lookup chain are inserted as a group after A.

Attached is a patch that implements the above behavior, implementing property (3). The only change is that before inserting a module into the lookup chain, we check to make sure we are inserting it after the origin class. make check passes with this patch. I'm not sure this implements property (4). Still, I believe this is an improvement and should be committed.

---

Do not allow Module#include to insert modules before the origin in the lookup chain

Module#include should only be able to insert modules after the origin, otherwise it ends up working like Module#prepend.

This fixes the case where one of the modules in the included module chain is included in a module that is already prepended to the receiver.

Fixes [Bug #7844](https://github.com/ruby/ruby/pull/4711)

PickachuEXE on GitHub requested this be backported to 2.7: [https://github.com/ruby/ruby/pull/4711](https://github.com/ruby/ruby/pull/4711). This does affect backwards compatibility, so I'm not sure it is something that should be backported. The 2.7 branch maintainer (usa (Usaku NAKAMURA)) will have to make that determination.

---

A backport ticket is created:

**#11 - 12/22/2020 01:58 AM - matz (Yukihiro Matsumoto)**
- Related to Bug #17423: ‘Prepend’ should prepend a module before the class added

---

03/25/2022
I have provided the reason for requesting this backport to 2.7 in that ticket

#14 - 08/06/2021 10:19 AM - Eregon (Benoit Daloze)
- Related to Bug #18064: Backport fix for bug 7844 (include/prepend satisfiable module dependencies are not satisfied) added

Files
include-after-origin-7844.patch 2.61 KB 08/08/2019 jeremyevans0 (Jeremy Evans)