# The Ship of Theseus: The Persistence of Material Objects Through Time

In this lesson, we will attempt to answer the question, 'How can a material object remain the SAME object over time, even if it goes through changes?' We will look at a puzzle introduced by the ancient Greeks, regarding a ship that has its parts replaced over time.

**1. Gradual Replacement:** Consider this story:

> **The Ship of Theseus (part 1):** Theseus owns and sails a ship, named Original. Every month, when he sails to port, he has one old plank of his ship replaced with a brand new plank. By the time 10 years have passed, not a single original plank of wood remains in Theseus' ship. As he replaces the very last original plank, he re-names the ship. 'I hereby dub thee "Shiny"!' he declares.

Question: Is Shiny the same ship as Original? That seems plausible. That answer is derived from the following principle:

> **The Gradual Replacement Principle:** If an object, X, is composed of many parts, and a single part of that object is replaced, producing object Y, then objects X and Y are one and the same object.

Call the Original ship $S_0$, and the ship with one plank replaced $S_1$. By this principle, $S_0=S_1$.

Now call the ship with two planks replaced $S_2$. By this principle, $S_1=S_2$. After all, in the transition from $S_1$ to $S_2$, we only took an object ($S_1$) which was composed of many parts, and replaced one single part to produce $S_2$. So, $S_1=S_2$. And by this same principle, $S_2=S_3$, $S_3=S_4$, and so on down the line.



$S_0$
"Original"

$S_1$

$S_2$

$S_3$
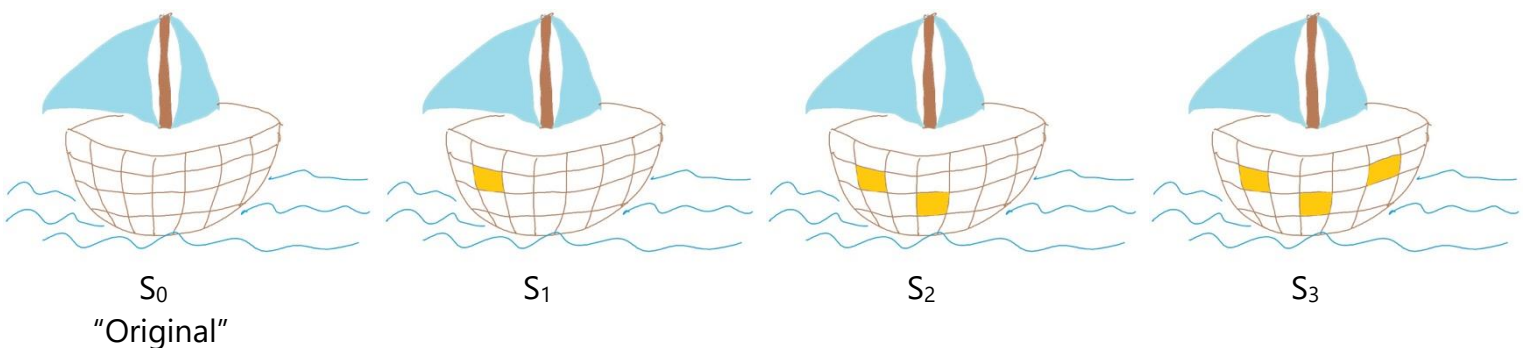
Call the ship at the end of the story, with all new parts, $S_{100}$, the ship that Theseus names "Shiny". By the Gradual Replacement Principle, $S_{99}=S_{100}$.



$S_{100}$
"Shiny"

But, the following law of identity also seems true:

**The Transitivity of Identity:** If A=B and B=C, then A=C.

By transitivity, if $S_0=S_1=S_2=S_3= ... = S_{99}=S_{100}$, then it follows that $S_0=S_{100}$!

In other words, it follows that Original=Shiny. So, even though it has had ALL of its parts replaced, it is still the same ship! [*Does that seem correct to you? Why or why not?*]

**2. Same Parts:** In 1655, Thomas Hobbes added to this story.

> **The Ship of Theseus (part 2):** Unbeknownst to Theseus, the ship repairman has saved all of the old planks that he has removed from Theseus' ship. Slowly, he constructs a new ship. By the end of the story, he has acquired every single original plank from Original and arranged them exactly as they were before any of the parts had been replaced. He dubs this new ship 'Rotten'.

Question: Is Rotten the same ship as Original? That seems plausible. This would follow if the following very plausible principle were true:

> **The Same Parts Principle:** If objects X and Y have all and only the same exact parts, arranged in the exact same way, then X and Y are one and the same object.

Since Original and Rotten have all and only the same parts arranged in the same way, it follows from this principle that they are one and the same ship. Original=Rotten. [*Does that seem correct? Why or why not?*]

**3. The Puzzle:** But wait. If ALL 3 principles above are true, we seem to have a problem:

1. Shiny=Original           (by Gradual Replacement Principle)
2. Rotten=Original          (by Same Parts Principle)
3. Therefore, Shiny=Rotten    (by Transitivity of Identity)

If all three principles are true, then it follows that Shiny (the sparkly ship that Theseus is sailing around in) and Rotten (the old, worn ship that the ship repairman is sailing around in) **are not two ships, but are actually just one ship**!

But, that is impossible. Shiny and Rotten are clearly two different ships. After all, they are composed of different parts, and sailing around in different parts of the sea!

Conclusion: Assuming that we do not wish to embrace the absurdity that Shiny and Rotten are just one ship, we must reject at least one of the three principles given. Unfortunately, rejecting any one of them would have very radical and surprising implications. Let's look at each of them in turn:

(a) **Transitivity:** Surely the transitivity of identity is true. For instance, if you know that 2+2=4 and 4=3+1, you can conclude with certainty that 2+2=3+1. If I tell you that Eminem is Slim Shady, and Slim Shady is Marshall Mathers, you can safely deduce that Eminem is Marshall Mathers. This principle is generally taken as an axiom of mathematics. Rejecting it would spell big trouble.

(b) **Gradual Replacement:** We generally accept the gradual replacement principle as well. You assume it in everyday life. For instance, if you take your car in to get a belt replaced, when they finish their work, you do not say, "Hey! Where is my car!? My car no longer exists! You destroyed it!" just because they replaced a single part. Rejecting this principle would be quite revisionary.

(c) **Same Parts:** But, the same parts principle seems true as well! Imagine that you own a bicycle, and your very kind roommate dismantles it, cleans all of the parts, and puts it back together. You would never say, "Hey! You destroyed my bike! It no longer exists! MERELY having the same parts at a later time isn't enough for something to be the same object as before!" No. You'd just say, "Thank you so much for cleaning my bike!"

**4. Conclusion:** There just does not seem to be a way to solve this puzzle without rejecting some principle that seems uncontroversially true!

By Gradual Replacement (and transitivity), Original=Shiny.
By Same Parts, Original=Rotten.

But, then, by transitivity, Shiny=Rotten. And this simply cannot be the case. So, whether we like it or not, we simply MUST reject one of these principles. [*Which one do YOU think we ought to reject? Why?*]

For more, check out this great video from philosopher, Jennifer Wang.