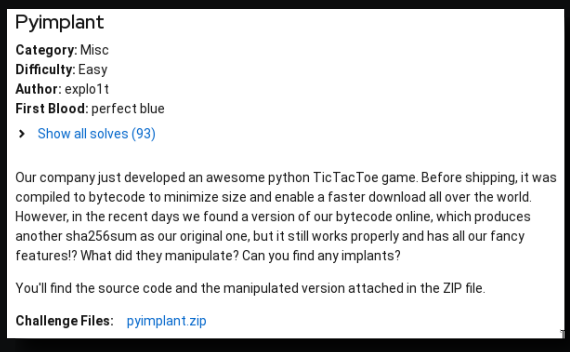
# Pyimplant

ALLES! CTF 2021

GoProSlowYo


Pyimplant

**Category:** Misc
**Difficulty:** Easy
**Author:** explo1t
**First Blood:** perfect blue

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Our company just developed an awesome python TicTacToe game. Before shipping, it was compiled to bytecode to minimize size and enable a faster download all over the world. However, in the recent days we found a version of our bytecode online, which produces another sha256sum as our original one, but it still works properly and has all our fancy features!? What did they manipulate? Can you find any implants?

You'll find the source code and the manipulated version attached in the ZIP file.

**Challenge Files:** pyimplant.zip

2021-09-03

# Contents

# Pyimplant

Writeup by: GoProSlowYo

Team: OnlyFeet

Writeup URL: GitHub

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```
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    shipping, it was compiled to bytecode to minimize size and enable a
    faster download all over the world. However, in the recent days we
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    all our fancy features!? What did they manipulate? Can you find any
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## Initial Research

We're given python source and a "modified" compiled pyc file. We're told one has been modified and to find the difference.

First we decided to look at a few tools that decompile python `.pyc` files into roughly their original source code:

```
$ docker run -it -v $PWD:/chal python bash
root@737f35ee8f80:/# pip install uncompyle6 decompyle3 && cd /chal
root@737f35ee8f80:chal/# decompyle3 manipulated_tictactoe.cpython-36.
    pyc
Error: decompyle3 requires Python 3.7-3.8
root@737f35ee8f80:/chal# uncompyle6 manipulated_tictactoe.cpython-36.
    pyc > decomp.py
root@737f35ee8f80:/chal# diff -y tictactoe.py decomp.py
root@737f35ee8f80:/chal# exit
$
```

## Version Mismatches

Here you can see decompyle3 complains that it want's us to use a specific version of python and decompyle6 output decompiled code that is exactly similar to the source code provided except some # comments missing.

We need to do a little more research and found that first we should be using the correct version of python that the `pyc` was created with. That appears to be version 3.6. Unfortunately running that `latest` docker container gave us python 3.9 which is a bit too new.

```
$ docker run -it -v $PWD:/chal python:3.6 bash
root@be34237eefad:/# pip install uncompyle6 decompyle3 && cd /chal
root@be34237eefad:/chal# uncompyle6 manipulated_tictactoe.cpython-36.
    pyc > decomp.py
root@be34237eefad:/chal# diff -y tictactoe.py decomp.py
```

### Ancient History or Stegosarus Time

And again, we found no differences so time to do more research. A little googling brought us to a great resource and in it we found mention of a tool called Stegosaurus.

Stegosarus gave us the flag pretty easily:

```
root@be34237eefad:/chal# git clone https://bitbucket.org/jherron/
    stegosaurus.git
Cloning into 'stegosaurus'...
Unpacking objects: 100% (18/18), 8.18 KiB | 2.73 MiB/s, done.
root@be34237eefad:/chal# python stegosaurus/stegosaurus.py -x
    manipulated_tictactoe.cpython-36.pyc
Extracted payload: ALLES!{py7h0n_byt3cod3_s3cr3ts}
```

### Victory

Submit the flag and claim the points:

**ALLES!{py7h0n_byt3cod3_s3cr3ts}**