Mission Impossible No 373

Original Intel 12/7, 12:00PM

Agent Report Due 12/13, 12:00PM

Special Agent 4908 has broken into Buckeye Nation’s national labs and stolen their new, secret software. HQ has identified two different projects that Buckeye Nation scientists are working on. It looks like the first project is computing something pretty intense and the second one is some kind of login/protection scheme.

1 Objectives

1.1 mystery.hex

HQ tried running this program, but it took over an hour to complete! It must be doing something really, really complicated (or really, really naïve...). HQ wants you to figure out what this program is doing, and replicate it.

You’ll need to submit to HQ:

• A written report (a few sentences) explaining what this program is doing
• An equivalent program that does the same thing. Your program does not need to compile down to the exact same code, it just needs to do the same thing. This should include:
  – Any required assembly (.s) and C (.c) files
  – A Makefile that generates the executable image solution.bin. Your solution should do the same thing as the mystery.hex program.
  – Your solution may include a maximum of 10 assembly instructions.

1.2 login.hex

HQ tried running this program as well, but it didn’t go much better. We were able to figure out a username, but couldn’t get the correct password. One of the engineers at HQ is sure this thing can be hacked to accept any password, but he’s not quite sure how to do it.

You’ll need to submit to HQ:

• The password that works for your uniqname with an unmodified binary.
• A one byte change to the program so that it will accept any valid-length password.

2 Resources

HQ has put together a few resources to help you out with your task.

2.1 Simulator

They’ve refined the department’s ARM simulator to iron out all of the bugs. You can grab a copy at

2.2 The .hex files
Those Buckeye scientists and engineers were busy, they made custom programs for every student in this class. You can find yours at the following links (replace UMID with your actual UMID):

http://www.eecs.umich.edu/~prabal/teaching/eecs373-f11/labs/final/UMID/mystery.hex
http://www.eecs.umich.edu/~prabal/teaching/eecs373-f11/labs/final/UMID/login.hex

2.3 Submitting to HQ
All materials should be submitted to HQ at wolverine-hq@umich.edu. Materials must be submitted to HQ by 12:00PM on 12/13. After 12:00PM HQ’s email address will disappear so that those nefarious Buckeyes can’t get a hold of it.

2.4 Hints
There may be some hints strewn about, so look carefully for things that look out of place and think of how information might be hidden.

2.5 Bribery
Rumor has it that there are some less than scrupulous Buckeye administrators that could possibly be bribed into providing some help, but their prices might be steep. That said, if you’re really stuck maybe they’ll be able to help you out. These unscrupulous individuals can be reached at buckeye-hq@umich.edu.

3 Good Luck!

This mission briefing will self-destruct in 5 seconds...