1. Due: Write the “Hello World” program described in class. Compile it and link it.
   (a) Include the source, object, and executable code.
   (b) Debug the program. What memory addresses contain the program’s environment strings?
   (c) Debug the program. What memory address contains the program’s arguments?
   (d) Debug the program, and stop it immediately before the syscall for write.
      • What is the current ESP?
      • What is the current EBP?
      • What is the current EIP?
   (e) Debug the program. Where is the message string located?
   (f) How many bytes are needed for the _start function?

2. Due: Write a program that starts a shell, meaning that it executes the program
      \bin\sh.

3. Due: What does it mean for a program in Unix/Linux to have its suid bit set?

4. Due: Take the program from problem #2, and make it suid root. Run the program.
      Do you have a root shell? Can you explain why?

5. Due: Modify the program from #2 by using the setreuid syscall so that when run
      suid it returns a root shell. Why would this ability be useful to an attacker?

6. Due: Write a program that uses execve to print out the current date and time, using
      the command \bin\bash -c date

7. Due: Write a program that loops through the list 2, 7, 9, 3, 7, 10 and determines if
      the number is larger than 5 or not. The program then prints a message for each case.
      You should obtain output like the following:

      The number is less than or equal to 5
      The number is greater than 5
      The number is greater than 5
      The number is less than or equal to 5
      The number is greater than 5
      The number is greater than 5

8. Due: Modify the previous program so that it uses the printf function from glibc
      so that the output looks like the following:

      The number 2 is less than or equal to 5
      The number 7 is greater than 5
      The number 9 is greater than 5
      The number 3 is less than or equal to 5
      The number 7 is greater than 5
      The number 10 is greater than 5