20875 Software Engineering

Tutorial 2

1. Download the archive file `secret.zip` and uncompress it. It contains three files: `alpha`, `beta` and `gamma`. They are executables (but for safety reasons, it is recommended to not execute them).

2. Determine the ISA and OS that `alpha` and `beta` were built for.

3. `alpha` is a well-known app. Determine which one.

4. `beta` contains a (badly) hidden password. Find this password.

5. `beta` also contains a compressed image. Determine the image format and the library it uses to uncompress it. (Note: `gamma` is the same app as `beta`, but compiled for a different platform.)

6. [hard] Extract this image from the executable files.

7. Write a C program that takes two arguments: a file name, and the size of this file in bytes. The program maps the contents of the file into memory using `mmap()`. Then, it accesses the contents and prints them in hexadecimal (similar to what `hexdump` does).

8. [long] Download source code of the library 'GMP' from `https://gmplib.org/` (latest version). Compile the library and run a few of the tests.

9. Consider the following task. We have a directory called `source/` that contains images. For each image, we want to create, in the directory `thumbnail/`, a version of this image whose width and height are both at most 256 pixels. You can use the `convert` or `magick` utility to that end. Write a `Makefile` that automates this task, and allows us to recompute the thumbnails only when source images are modified.

   Hint: a few links to the `magick` documentation:

   - General `magick` command documentation
   - `-scale` parameter
   - geometry specification