

Assignment 1: BitTorrent Part 1

Due date: Saturday, 1 March 2025 at 22:00

This is an individual assignment. You may discuss it with others, but your code and documentation must be written on your own. In particular, do not use automated code-generation tools such as ChatGPT or GitHub copilot.

This is the first of a series of assignments in which you will implement a BitTorrent client using the C programming language. You should therefore start by reading the specification for the BitTorrent protocol.¹

You are provided with a project setup that you can use to create such an implementation. The project setup is available on the iCorsi system. To build the entire project, run the `make` command. The project also contains a test suite that you can run with `make check`. The project Makefile also includes a rule to run the tests with *Valgrind* to help you detect possible memory leaks in your implementation. To run the tests with *Valgrind*, use the `make check-valgrind` command. For this assignment, you will be mainly working with the `bencode.c`, `bencode.h`, and `metainfo.c` files.

For this first assignment, you will have to implement the encoding used by BitTorrent (bencode) and the loading of a metainfo file, also known as torrent file and typically saved with a `.torrent` file-name extension. You can find the detailed specification for the implementation of each declared function in the corresponding sections of the BitTorrent protocol specification. Note that a metainfo file is a file containing a specific bencoded structure. For the purpose of the assignment, your implementation is only required to support the download of a single file. Therefore, you can assume that the info dictionary of the metainfo file will never contain a `files` key, and will instead always contain a `length` key.

Submission Instructions

Submit the `bencode.c`, `bencode.h`, and `metainfo.c` files through the iCorsi system. Do not submit other files. Add comments to your code to explain sections of the code that might not be clear. You must also add comments at the beginning of the source file to properly acknowledge any and all external sources of information you may have used, including code, suggestions, and comments from other students. If your implementation has limitations and errors you are aware of (and were unable to fix), then list those as well in the initial comments.

You may use an integrated development environment (IDE) of your choice. However, *do not submit any IDE-specific file*, such as project description files.

¹https://www.bittorrent.org/beps/bep_0003.html