01204213: Homework 6

Due: 23pm, 30 Aug 2021.

1. (Siper 3.8) Give implementation-level descriptions of Turing machines that decide the following languages over the alphabet $\{0, 1\}$.

   (a) $\{w \mid w \text{ contains twice as many 0s as 1s}\}$.

   (b) $\{w \mid w \text{ does not contain twice as many 0s as 1s}\}$.

2. (Siper 3.15) Show that the collection of Turing-recognizable languages are closed under the operation of

   (a) concatenation.

   (b) star.

   (c) intersection.

3. (Siper 3.16) Show that the collection of decidable languages are closed under the operation of

   (a) concatenation.

   (b) star.

   (c) complementation.

   (d) intersection.