**Question 1:** (10 points)

Google has just hired you for a summer internship to work in the YouTube team. As an intern, your first job is to understand the performance of an in-house 2 GHz processor that Google uses to compress digital video data into Google's open and royalty free VP9 video compression format. Assuming that the compression job requires 1 billion instructions in total and includes the following distribution of instructions:

| Instruction | % of total Instructions | CPI |
|---|---|---|
| Integer | 10 | 1 |
| Floating point | 20 | 3 |
| Load | 30 | 2 |
| Store | 20 | 1 |
| Branches | 15 | 4 |
| Other | 5 | 1.5 |

**a.** (5 points) Compute the average CPI for this video encoder.

**b.** (5 points) How long does it take the encoder to execute?