Solutions

2.1

- The compiler (cc1): main.i → main.s ✓.

2.2

- The linker (ld) ✓.

2.3

- The linker ✓.

3.1

- (i) Preprocessor (cpp): macro-expansion error – pure text, no type knowledge exists yet ✓.
- (ii) Linker (ld): undefined reference – the object exists; the symbol does not ✓.
- (iii) Assembler (as): instruction error – earlier stages see C, not register names ✓.
- Each stage owns one language: text, types, instructions, symbols – errors localise by construction ✓.

3.2

- Compiled: translated before running – faster start-up after the build, binary tied to the machine ✓.
- Interpreted: read and executed at run time – slower per line but portable to any machine with the VM ✓.
- Separate compilation: only changed files recompile; the linker re-resolves symbols across the objects to rebuild the whole ✓.