

The **focus** of this homework assignment is learning more of RISC-V assembly language programming, and in particular on implementing simple conditionals and loops. As did the previous assignment, this one will also use the *RARSM*¹ environment. The most closely related portions of the textbooks are Chapters 3 and 4 of the *RVAP*² book and Section 2.7 of the *COAD*³ book.

The **main programming task** to write an assembly language program corresponding to the following C program (using discussions in class and the discussion forum to clarify details of the correspondence):

```
1  #include <stdio.h>
2  #include <stdint.h>
3  int main() {
4      uint32_t s;
5      scanf("%u", &s);
6      printf("%u\n", s);
7      while (s > 1) {
8          if (s % 2 == 0) s /= 2;
9          else s = 3 * s + 1;
10         printf("%u\n", s);
11     }
12     return 0;
13 }
```

Input-output: The hw02 program should read its input from the *standard input* stream and write its output to the *standard output* stream. Optional diagnostics may be written to the *standard error* stream. It is very important that the program read its input only from the standard input stream and that it write nothing except the specified output to the standard output stream.

The **packaging and submission** requirements are similar to those in the previous homework assignment, with hw01 replaced by hw02. Similarly, the rules for using additional **resources** are the same as before.

Optional background information (not needed for the homework, but great stuff): https://en.wikipedia.org/wiki/Collatz_conjecture

¹Jean Privat and others, RARSM—RISC-V Assembler and Runtime Simulator (iMproved), <https://github.com/rarsm/rars>, 2024.

²Robert Winkler, *RISC-V Assembly Programming* (Robert Winkler, 2024).

³David A Patterson and John L Hennessy, *Computer Organization and Design RISC-V Edition*, 2nd edition (Morgan Kaufmann, 2020).