



Assignment 7 Floating Point Addition

Deadline: 8 April 2022 at 23:59 on Submittity

Working individually, complete the assignment below. Submit your solution to Submittity (<https://submit.scss.tcd.ie>). By submitting your solution, you are confirming that you have familiarised yourself with College's policy on plagiarism (<https://libguides.tcd.ie/plagiarism>).

Your mark will be the auto-graded mark assigned by Submittity (10 marks) plus a manually assigned mark (5 marks) for programs that demonstrate (i) excellent presentation, (ii) helpful, concise pseudocode comments, (iii) well-implemented subroutines and (iv) a well-structured approach to solving the problem using your subroutines from Assignment #6.

You are allowed to submit five attempts for the assignment without penalty. Subsequent attempts will attract a 1 mark penalty each, up to a maximum penalty of 5 marks.

Submittity will allow you eight "late days" over the full semester. This means, for example, you can submit one assignment late by eight days or eight assignments late by one day (or part thereof) each, without penalty. Once your "late days" are used up, you will receive zero marks for any late submissions.

Instructions

Design and write an ARM Assembly Language subroutine that implements the interface described below to add two IEEE-754 floating point numbers. Your subroutine should return a result that is also in IEEE-754 format.

Your solution should make use of the `fp_frac`, `fp_exp` and `fp_enc` subroutines that you developed for Assignment #6.

Develop your solution using the `asmt-17-fpadd` template program in the CSU1102x repository. Submit your solution to Submittity (<https://submit.scss.tcd.ie>).

You should view Lecture 4.4 before attempting this assignment.

`fp_add` subroutine

```
1 @ fp_add subroutine
2 @ Add two IEEE-754 floating point numbers
3 @
4 @ Parameters:
5 @   R0: a — first number
6 @   R1: b — second number
7 @
8 @ Return:
9 @   R0: result — a+b
10 @
```



Your subroutine should use `fp_frac` and `fp_exp` to decode the fraction and exponent of the two numbers, a and b . You should then add the two numbers and encode the result as an IEEE-754 number using your `fp_enc` subroutine.

Hints

Use the online IEEE-754 calculator at <https://www.h-schmidt.net/FloatConverter/IEEE754.html> to create test values. Start with simple values (e.g. 1.5, 10.5 and -1.5)