Lab 2 – FPU & FP Calculator

CSE 479 – Advanced Embedded Systems
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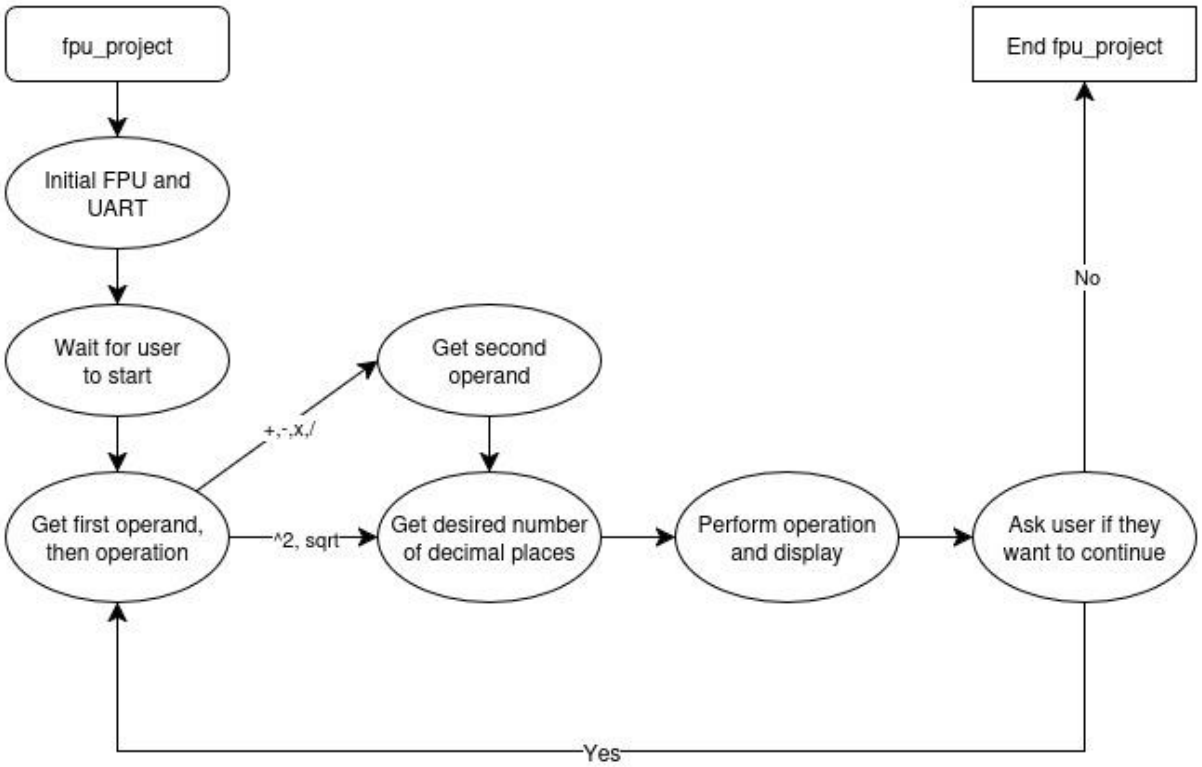
Program Overview:

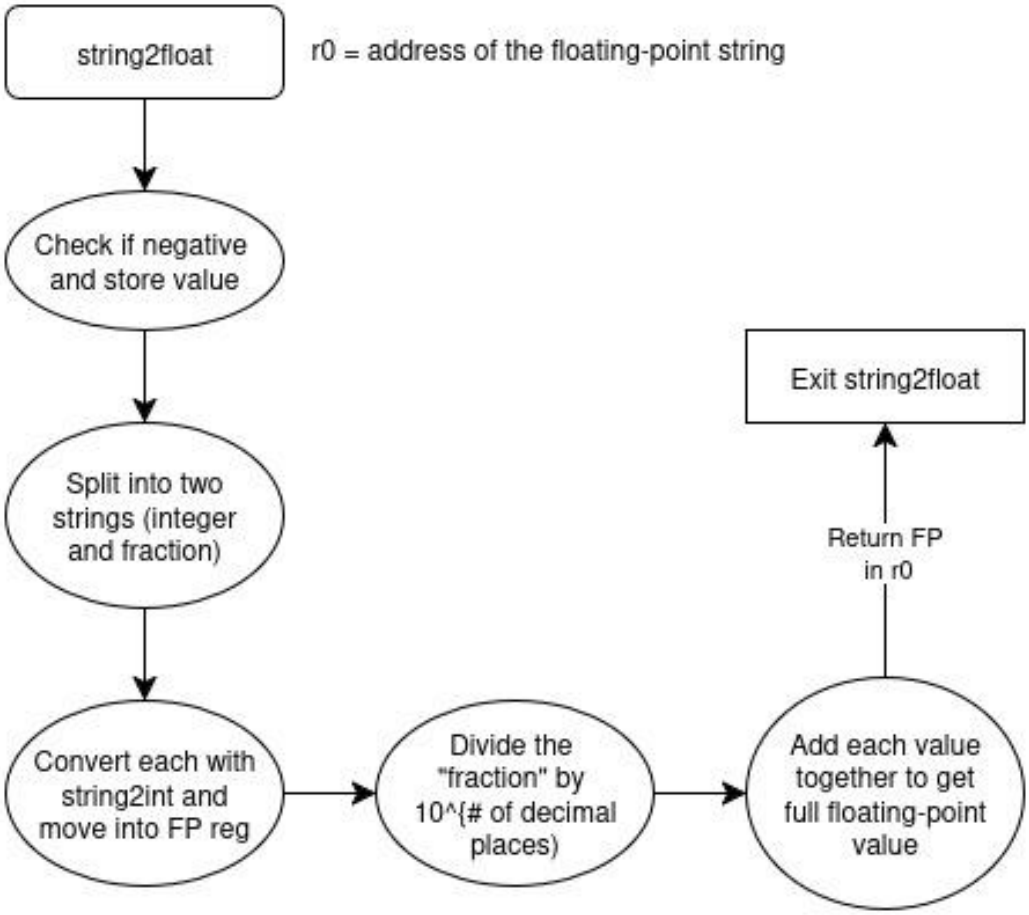
Description:

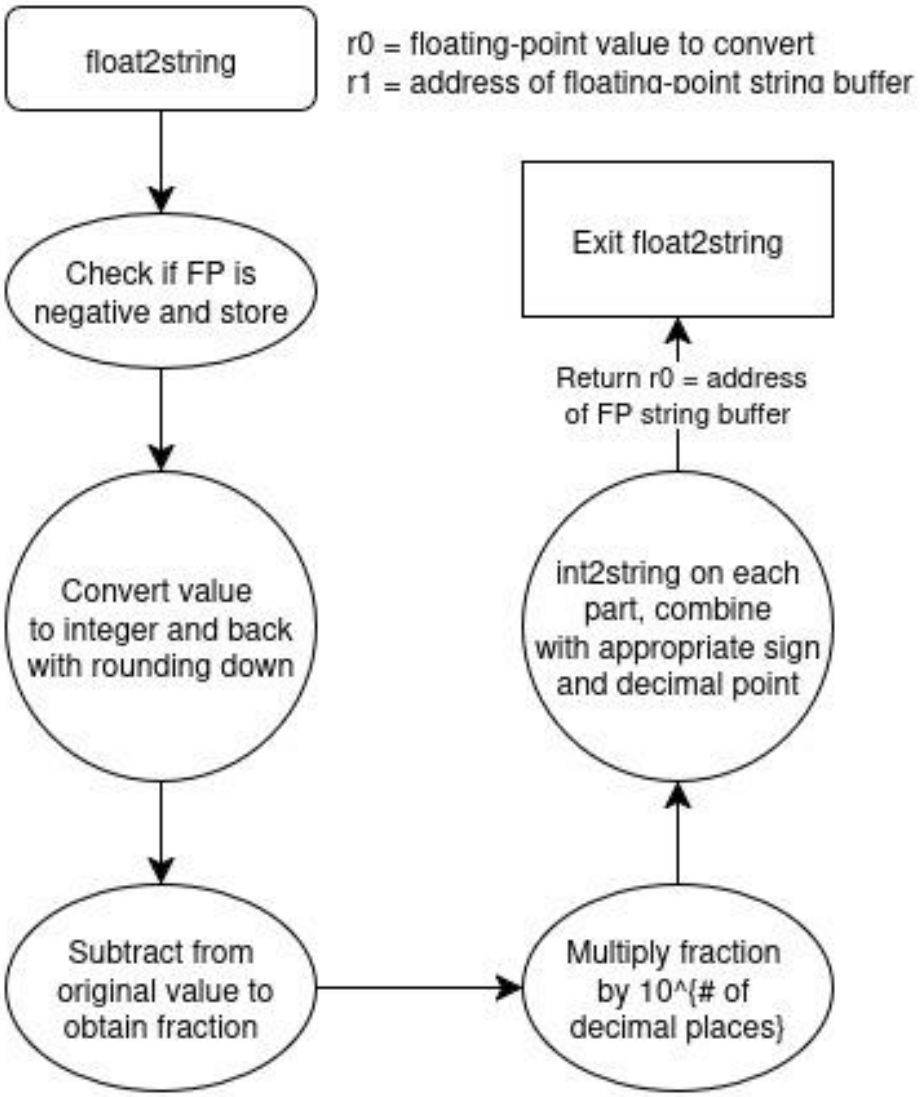
The FPU calculator offers the following operations: addition, subtraction, multiplication, division, square, and square root. The program only begins once the user indicates they are ready. They are first prompted to enter the first operand, then the operation, and if applicable, the second operand. They also get to specify how many decimal places the result truncates to. The FPU calculator converts the i input from PU calculator converts the input from a string into a floating-point value(s), performs the specified operation, and then converts the result back into a string for the user to see. The user can then decide to continue using the FPU calculator or to exit.

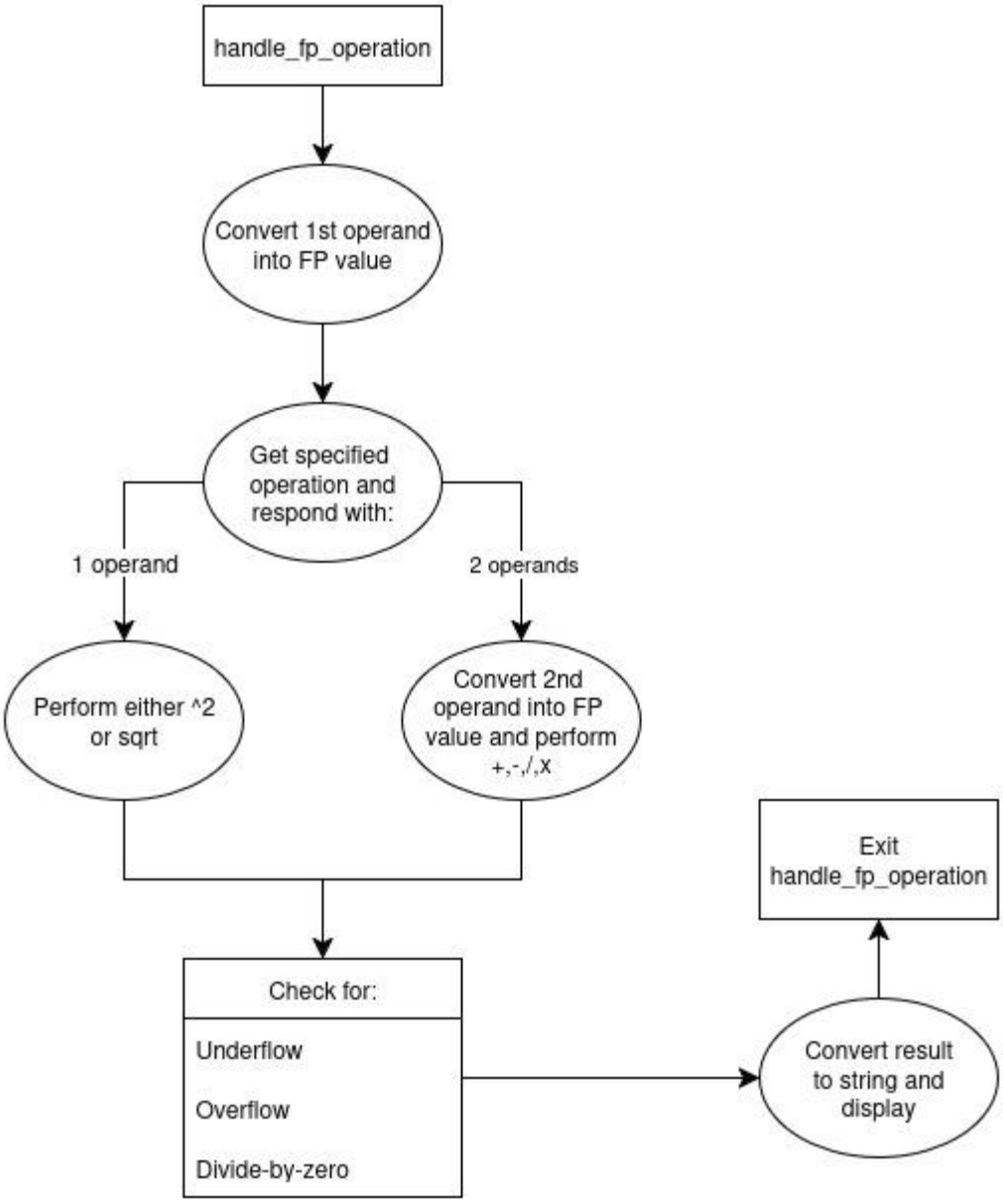
High-Level Flowchart:

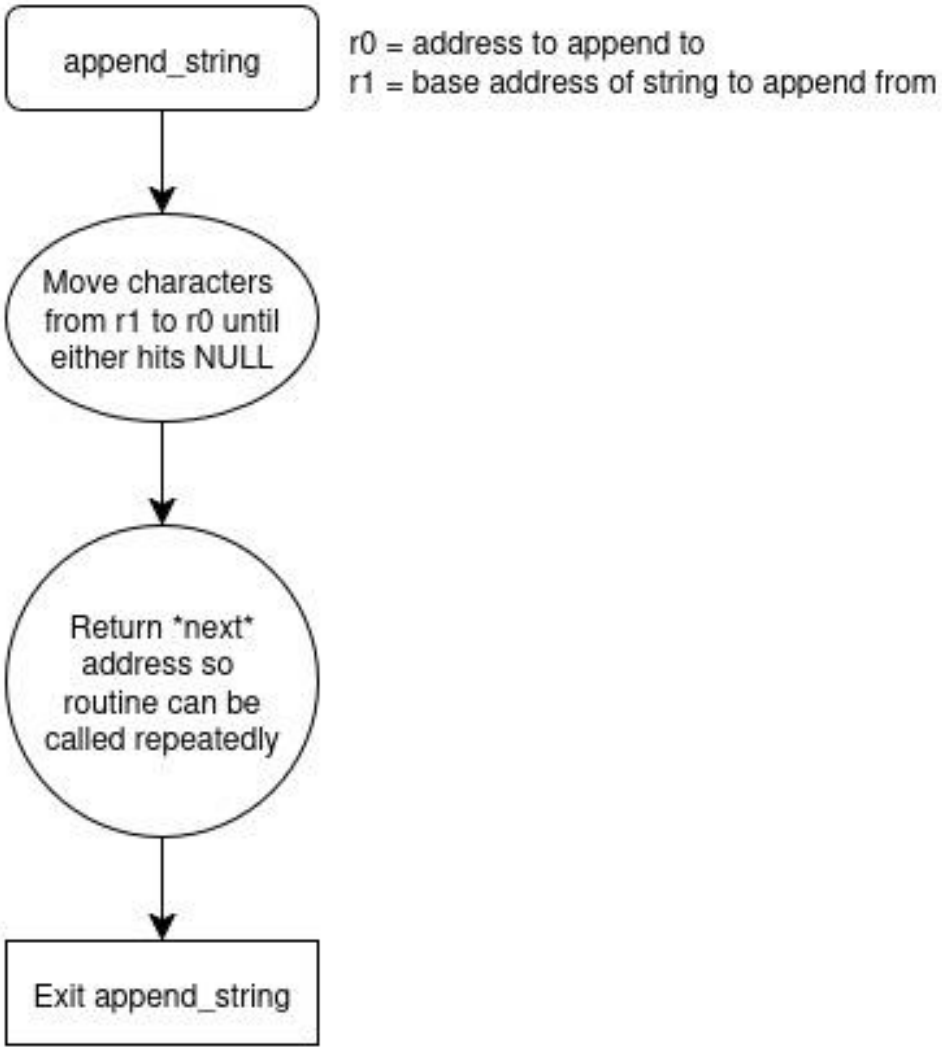


Subroutines:




float2string
r0 = floating-point value to convert
r1 = address of floating-point string buffer
Check if FP is negative and store
Convert value to integer and back with rounding down
Subtract from original value to obtain fraction
Multiply fraction by 10^{# of decimal places}
int2string on each part, combine with appropriate sign and decimal point
Return r0 = address of FP string buffer
Exit float2string


handle_fp_operation
Convert 1st operand into FP value
Get specified operation and respond with:
1 operand
2 operands
Perform either ^2 or sqrt
Convert 2nd operand into FP value and perform +,-,/,x
Check for:
Underflow
Overflow
Divide-by-zero
Convert result to string and display
Exit handle_fp_operation


append_string
r0 = address to append to
r1 = base address of string to append from
Move characters from r1 to r0 until either hits NULL
Return *next* address so routine can be called repeatedly
Exit append_string