

CPEN 211 Computer Systems I, 2023
Lab Proficiency Test #2

Question 2 [2 marks, part marks possible]: Create a file named “q2.s” and inside it write ARM assembly to implement the C code for function funky below. Assume that the base of array A is in R0, and that the base of array B is in R1.

```
int funky(int *A, int *B) {
    int result = 0, top = -1, next = 0;
    do {
        if ( A[next] != 0 ) {
            top = top + 1;
            B[top] = A[next + 2];
            next = A[next + 1];
        } else {
            result = result + A[next + 1];
            if ( top >= 0 ) {
                next = B[top];
                top = top - 1;
            } else {
                next = -1;
            }
        }
    } while( next >= 0 );
    return result;
}
```

The autograder requires the result returned by funky be in R0 after your code executes. Your q2.s must contain the ARM code below. Replace the comment “// ADD YOUR CODE HERE” with your ARM code for funky. Ensure the ARM code you add does not modify R13 or R14. With the input arrays A and B given in the code below, after your code runs R0 should contain 6, B[0] should contain 6, and B[1] should contain 12. If you wish to try additional tests you will first need to carefully study the C code above to figure out what it does before modifying arrays A and/or B. You may ignore “Function clobbered register(s)” warnings in the online simulator. Your **last** “Lab Proficiency Test #2” attempt must include both “q1.s” and “q2.s”.

```
.global funky
funky:
    // ADD YOUR CODE HERE
    MOV PC, LR

.global _start
_start:
    LDR R0,=A
    LDR R1,=B
    BL funky
end: B end // infinite loop; R0 should contain return value of funky

A: .word 1,3,6, 1,9,12, 0,1,0, 0,2,0, 0,3,0
B: .word 0,0,0,0,0
```