Problem Set 4

Erlend Paulsen Skaaden

Task 1: TAC

The following is a translation into TAC. I have assumed that shadowing, i.e i = i + 1 is allowed. Furthermore, I have assumed that to print, you push the print arguments onto the stack and then call it.

```
func main ( )
    iter = 2
    LmainLoopTest:
        if iter >= 40 goto LmainLoopEnd
        param iter
        count = call collatz 1
        param " steps"
        param count
        param " converges in"
        param iter
        call print 4
        iter = iter + 1
        goto LmainLoopTest
    LmainLoopEnd:

    return 0

func collatz ( n )
    steps = 0
    LcollatzLoopTest:
        if n <= 1 goto LcollatzLoopEnd
        i = n / 2
        t1 = i * 2
        if n != t1 goto LcollatzElse
        n = i
        goto LcollatzIfEnd
    LcollatzElse:
        t1 = 3 * n
        t2 = t1 + 1
        n = t2
    LcollatzIfEnd:
        steps = steps + 1
        goto LcollatzLoopTest
    LcollatzLoopEnd:

    return steps
```

Task 2: Implementation

The rest of the problem set can be viewed in the delivered code.