While Loops

```
while  condition
    :
    statements
    :
end
```


Flowchart: Start → if condition → True → statements (loops back); False → end
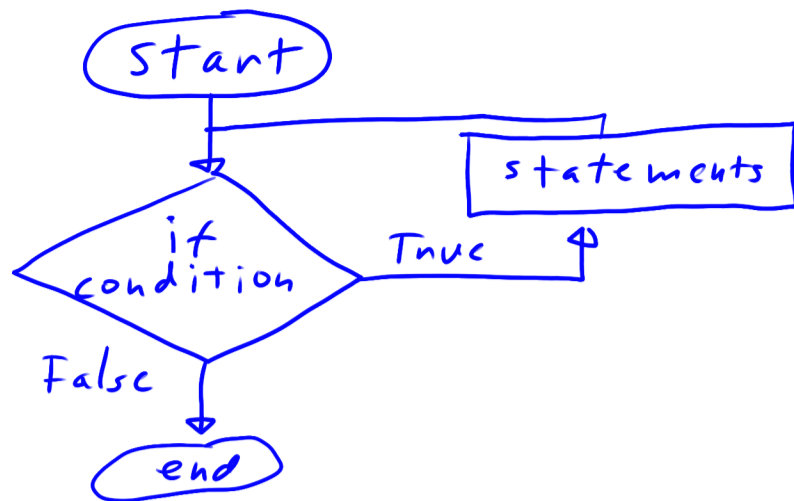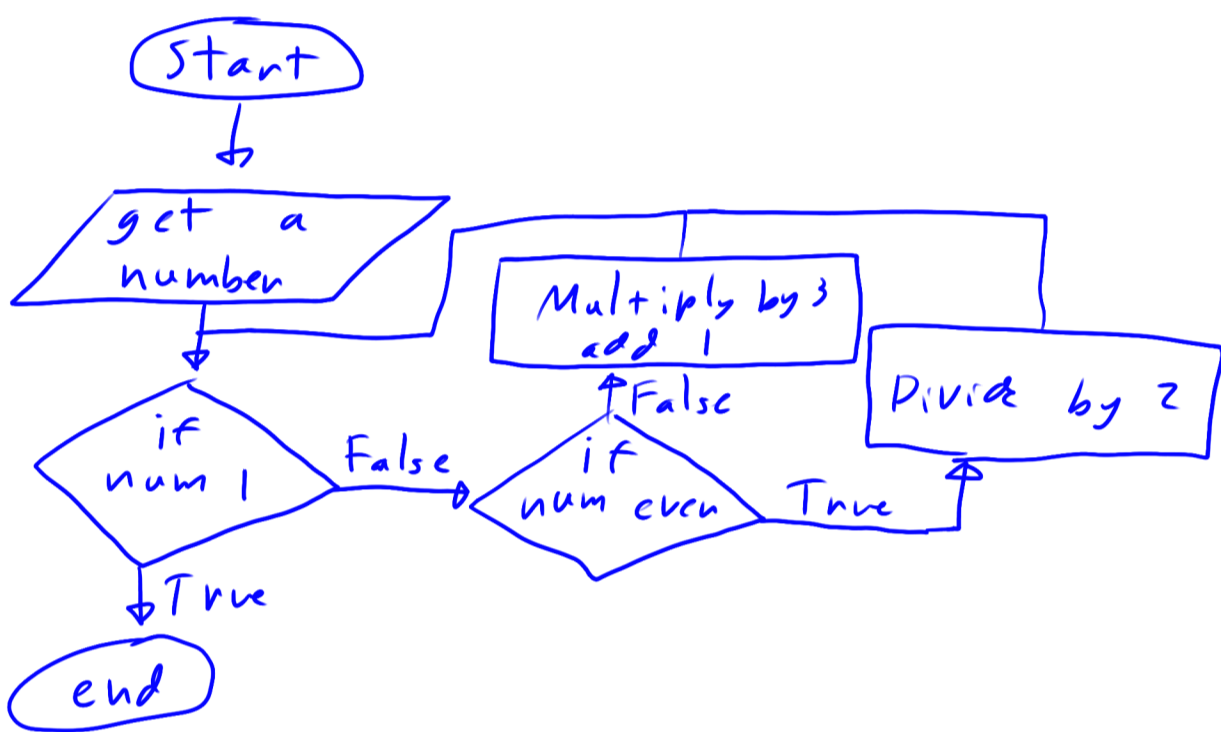
```
for  i  =  1:10
    disp(i)
end
```

```
i = 1
while  i<= 10
    disp(i)
    i = i+1
end
```

Collatz conjecture
Even   divide by 2
Odd   multiply by 3   and   add 1

Flowchart: Start → get a number → if num 1 → True → end; False → if num even → True → Divide by 2 → (loop); False → Multiply by 3 add 1 → (loop)

Babalognian Square Root Method
    to find the square root of S
    make a guess X

$$X = (X + \frac{S}{X})/2$$ Creates another guess that
                              is closer to the true square
                              root

Find the square root of 4
    S=4   X=3

$$X = (3 + \frac{4}{3})/2 = 2.17$$

$$X = (2.17 + \frac{4}{2.17})/2 = 2.0067$$

tolerence $|x*x - S| < 0.001$

Flowchart: Start → get a s number → X = S → if $|x*x - S| < 0.001$ → False → $X = (x + \frac{S}{x})/2$ → (loop back) → end