

Assertion

A logical expression that must always be true at a given point in a program.

// { ... } Hoare notation

Used to check if logical flow of program is correct

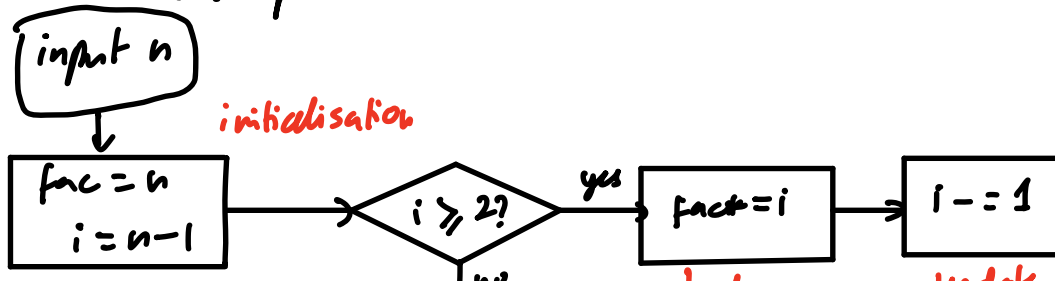
De Morgan's Law

Looping Statements

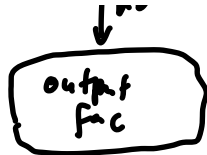
Components of a looping statement:

- loop body
- loop initialisation
- loop update
- Terminating condition: when to stop repeating
- loop invariant

Factorial loop



terminating
condition



body

update

for loop structure

```
for (initialize; condition; update) {  
    body;  
}
```

while loop

```
initialize;  
while (condition) {  
    body & update;  
}
```

do-while loop

```
initialize  
do {  
    body & update;  
} while (condition);
```

A do-while loop ensures that the body is executed at least once

Loop invariant

An assertion that holds before the loop, after the loop $\frac{1}{2}$ at the end of each iteration of the loop.