Aufgabe 4.1

(1) Aufgabe

```
1 statement;
2 while ¬booleanexpr do
3     statement
4 endwhile
```

(2) Aufgabe

```
1 if statement
2     repeat
3         statement
4     until ¬booleanexpr
5     endrepeat
6 endif
```

Aufgabe 4.2

This task is based on the previous task 3.1

(1) changeorientation method

```
1 var degree : Real;
2 pre −
3 post orientation() = degree
4 reads degree
5 changes −
6 mem −
```

(2) movetopoint method

```
1 var x, y, currOrientation, currX, currY : Real;
2 pre currOrientation = orientation(), currX = xpos(), currY = ypos()
3 post xpos() = x, ypos() = y, orientation() = currOrientation
4 reads xpos, ypos, orientation
5 changes xpos, ypos, orientation, currOrientation, currX, currY, x, y
6 mem −
```

Aufgabe 4.3

(1) Specification

```
1  var  n, prev, curr, fibn : Integer
2  pre  n >= 0, prev = 1, curr = 0, fibn = 0;
3  post  fibn = fibonnaci(n)
4  reads  n
5  changes prev, curr, fibn
6  mem  −
```

(2) Algorithm

```
1  module fib(n: Integer) : Integer
2    var prev, curr, fibn : Integer;
3    prev := 1;
4    curr := 0;
5    fibn := 0
6    repeat n times
7      fibn := prev + curr;
8      prev := curr;
9      curr := fibn;
10   endrepeat;
11 endmodule
```