ALGPSEUDOCODE

hello, world

1. Basic forms

1.1. The Simple Statement.

1: $S \leftarrow O$

1.2. Unnumbered Simple Statement.

$S \leftarrow O$

1: $S \leftarrow O$

1.3. Simple Statement with Comment.

1: $S \leftarrow O$ ▷ comment

1.4. The Precondition (never numbered).

Require: $x \neq 0$ and $n \geq 0$ ▷ blah blah blah

1.5. The Postcondition (never numbered).

Ensure: $x \neq 0$ and $n \geq 0$ ▷ blah blah blah

1.6. Procedure.

1: **procedure** EUCLID(a, b) ▷ The g.c.d. of a and b
2: $r \leftarrow a \bmod b$
3: **while** $r \neq 0$ **do** ▷ We have the answer if r is 0
4: $a \leftarrow b$
5: $b \leftarrow r$
6: $r \leftarrow a \bmod b$
7: **end while**
8: **return** b ▷ The gcd is b
9: **end procedure**

1.7. Function.

1: **function** EUCLID(a, b)
2: $r \leftarrow a \bmod b$
3: **while** $r \neq 0$ **do**
4: $a \leftarrow b$
5: $b \leftarrow r$
6: $r \leftarrow a \bmod b$
7: **end while**
8: **return** b
9: **end function**

1.8. **The *if-then-else* Statement.**

```
1: if some condition is true then                                  ▷ comment
2:     do some processing
3: else if some other condition is true then                       ▷ comment
4:     do some different processing
5: else if some even more bizarre condition is met then            ▷ comment
6:     do something else
7: else                                                            ▷ comment
8:     do the default actions
9: end if
```

1.9. **The *for* Loop.**

```
1: for i = 0 to 10 do                                              ▷ comment
2:     carry out some processing
3: end for
```

```
1: for all i such that 0 ≤ i ≤ 10 do                               ▷ comment
2:     carry out some processing
3: end for
```

1.10. **The *while* Loop.**

```
1: while some condition holds do                                   ▷ comment
2:     carry out some processing
3: end while
```

1.11. **The *repeat-until* Loop.**

```
1: repeat                                                          ▷ comment
2:     carry out some processing
3: until some condition is met
```

1.12. **The Infinite Loop.**

```
1: loop                                                            ▷ comment
2:     this processing will be repeated forever
3: end loop
```

1.13. **Returning Values.**

2. Some longer examples

2.1. ***if-elsif-else*.**

```
   a ← 1
   if a is even then
3:     PRINT "a is even"
   else if a is odd then
       PRINT "a is odd"
6: else
       PRINT "a is really weird"
   end if
```

2.2. **Nested structures.**

Require: $n \geq 0$
Ensure: $y = x^n$
  $y \leftarrow 1$
  $X \leftarrow x$
  $N \leftarrow n$
  while $N \neq 0$ **do**
    if N is even **then**
      $X \leftarrow X \times X$
      $N \leftarrow N/2$
    else ▷ N is odd
      $y \leftarrow y \times X$
      $N \leftarrow N - 1$
    end if
  end while