

## Python programs

1. Truth table

- (a) Create a function `truth1` that returns the truth value of

$$(p \vee q) \rightarrow r.$$

- (b) Create a function `truth2` that returns the truth value of

$$(p \rightarrow r) \wedge (q \rightarrow r).$$

- (c) Create truth tables using loops for each of these functions and verify that they are equivalent.

2. For a given  $N$ , compute the Wallis product

$$\prod_{k=1}^N \frac{2k}{2k-1} \cdot \frac{2k}{2k+1}$$

(This approaches the value of  $\pi/2$  for large  $N$ .)

- (a) First, note that  $\Pi$  represents a product, just like  $\Sigma$  represents a sum.
- (b) Create a variable to hold the product and initialize its value as 1.
- (c) Use a loop to build the product.
- (d) Print the result.
- (e) As a test, print the result for  $N = 10, 20, 100$ .