

# IF

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# Chapter 1

## The GAP InterFace to other Computer Algebra Systems (CAS)

Warning: this file is under construction! You can find the documentation in the ../README file.

### 1.1 User's manual

#### 1.1.1 IF Interface

◇ `IF_Interface( conventional_CAS_name, CAS_function_name, List_of_Gap_objects )`  
(function)

See the ../README file for the list of interfaced CASes and the `conventional_CAS_name`'s. `CAS_function_name` is the name of the function in the interfaced CAS, and is given as a string. `List_of_Gap_objects` is a list of Gap objects,  $O_1, O_2, \dots, O_n$ , that will be used as arguments of `CAS_function_name` (it may be empty).

`IF_Interface` does the following:

- converts each object  $O_1, O_2, \dots, O_n$  in `List_of_Gap_objects` into the corresponding object  $P_1, P_2, \dots, P_n$ , of the interfaced CAS;
- sends the command `CAS_function_name(P1, P2, ..., Pn)` to the interfaced CAS;
- gets the output from the interfaced CAS;
- converts it to the corresponding Gap object, and returns it to the user.

With the code already implemented, the interface can perform, for instance, calculation like the following from within Gap, using the function `primes`, `omega`, and `nextprime`, of Pari/Gp.

```
Example
IF_Interface( IF_pari_gp, "primes", [10] );
IF_Interface( IF_pari_gp, "omega", [360] );
IF_Interface( IF_pari_gp, "nextprime", [119] );
```

In the following example the greatest common divisor of 1000 and 360 is calculated using each CAS.

```
Example
IF_Interface(IF_asir, "igcd", [1000, 360] );
IF_Interface(IF_cocoa, "GCD", [1000, 360] );
IF_Interface(IF_kash, "IntGcd", [1000, 360] );
```

```

IF_Interface(IF_singular, "gcd", [1000, 360] );
IF_Interface(IF_plural, "gcd", [1000, 360] );
IF_Interface(IF_pari_gp, "gcd", [1000, 360] );
IF_Interface(IF_gap, "GcdInt", [1000, 360] );
IF_Interface(IF_aribas, "gcd", [1000, 360] );
IF_Interface(IF_mupad, "gcd", [1000, 360] );
IF_Interface(IF_maple, "gcd", [1000, 360] );
IF_Interface(IF_macaulay, "gcd", [1000, 360] );
IF_Interface(IF_mathematica, "GCD", [1000, 360] );
IF_Interface(IF_yacas, "Gcd", [1000, 360] );

```

This second example shows that it is possible to interface many CASes in the same Gap session.

Example

```

gap> IF_Interface(IF_mupad, "combinat::partitions::list", [4]);
[ [ 4 ], [ 3, 1 ], [ 2, 2 ], [ 2, 1, 1 ], [ 1, 1, 1, 1 ] ]

gap> IF_Interface(IF_mupad, "combinat::tableaux::list", [[4,2]]);
[ [ [ 5, 6 ], [ 1, 2, 3, 4 ] ], [ [ 4, 6 ], [ 1, 2, 3, 5 ] ],
  [ [ 3, 6 ], [ 1, 2, 4, 5 ] ], [ [ 2, 6 ], [ 1, 3, 4, 5 ] ],
  [ [ 4, 5 ], [ 1, 2, 3, 6 ] ], [ [ 3, 5 ], [ 1, 2, 4, 6 ] ],
  [ [ 2, 5 ], [ 1, 3, 4, 6 ] ], [ [ 3, 4 ], [ 1, 2, 5, 6 ] ],
  [ [ 2, 4 ], [ 1, 3, 5, 6 ] ] ]

```

### 1.1.2 InfoInterfaces

◇ InfoInterfaces

(info class)

The following command

Example

```
gap> SetInfoLevel( InfoInterfaces, 1 );
```

tells to Gap to print the input and the output of the interfaced CAS; it may be useful for debugging purposes. This debugging information is suppressed by

Example

```
gap> SetInfoLevel( InfoInterfaces, 0 );
```

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