

## Names

## Use descriptive names

`max_wait_time_in_seconds, iso3166tab.`

## Prefer solution domain and problem domain terms

Business layers: account, ledger

Technical layers: queue, tree

## Use plural

E.g. countries instead country

## Use pronounceable names

`detection_object, dobj`

## Avoid abbreviations

`customizing, cust`

## Use same abbreviations everywhere

`dobjt, dot, dtype`

## Use nouns for classes and verbs for methods

`account, withdraw, is_empty`

## Avoid noise words

`data, controller, object`

## Pick one word per concept

`read, retrieve, query`

## Use pattern names only if you mean them

E.g. factory, façade, composite

## Avoid encodings, esp. Hungarian notation and prefixes

`result = a + b`

`rv_result = iv_a + iv_b`

## Language

## Mind the legacy

Try new syntax before applying

## Mind the performance

Measure potentially slower patterns

## Prefer object orientation over procedural programming

I.e. classes over functions and reports

## Prefer functional over procedural language constructs

E.g. `index += 1` instead `ADD 1 to index`

## Use design patterns wisely

I.e. where appropriate

## Comments

## Express yourself in code, not in comments

`assert_is_valid( input )`  
~~"checks whether user input is valid"~~  
~~check( x )~~

## Comments are no excuse for bad names

`DATA total_sum`  
~~"the total sum"~~  
`DATA s`

## Use methods instead of comments to segment your code

`do_a( ).`  
`do_b( ).`  
~~"do a"~~  
`a = b + 1.`  
~~"do b"~~  
`x = a / 10.`

## Write comments to explain the why, not the what

~~" can be missing if ..."~~  
~~" reads the itab"~~  
`READ TABLE itab`

## Design goes into the design documents, not the code

~~" some general observations on this"~~

## Comment with ", not with \*

`" inlines nicely`  
`* aligns to weird places`

## Put comments before the statement they relate to

`" right here`  
`do_it( ). " not there`  
~~" not there"~~

## Delete code instead of commenting it

~~" READ TABLE~~

## Use FIXME, TODO, and XXX and add your ID

`" FIXME FH check sy-subrc!`

## Don't add method signature and end-of comments

`ENDIF. " IF a = 0.`

## Don't duplicate message texts as comments

`" Business document not found`  
`MESSAGE e100.`

## ABAP Doc only for public APIs

`PRIVATE SECTION.`  
~~"! Reads something"~~  
`METHODS read_something`

## Formatting

## Optimize for reading, not for writing

`DATA: a`  
~~" b.~~

## Use the Pretty Printer before activating

Always!

## Use your Pretty Printer team settings

Always!

## No more than one statement per line

~~don't( ). do\_this( )~~

## Stick to a reasonable line length

`<= 120 characters`

## Condense your code

No whitespace in weird places

## Add a single blank line to separate things, but not more

No whitespace in weird places

## Don't obsess with separating blank lines

No whitespace in weird places

## Align assignments to the same object, but not to different ones

`structure-type = 'A'.`  
`structure-id = '4711'.`

## Close brackets at line end

`updater->update( this`  
`).`

## Keep single parameter calls on one line

`just_like( that )`

## Keep parameters behind the call

`break_only(`  
`if_the_line_gets_too_long ).`

## If you break, indent parameters under the call

~~DATA(sum) = add\_two\_numbers(~~  
~~value\_1 = 5~~  
~~value\_2 = 6 ).~~

## Line-break multiple parameters

~~add\_two\_numbers( a = 5 b = 6 ).~~

## Align parameters

## Break the call to a new line if the line gets too long

`DATA(result) =`  
`some_object->some_interface~a_method(`  
`a = 1`  
`b = 2 ).`

## Indent and snap to tab

Don't force people to add single spaces

## Indent in-line declarations like method calls

`merge( a = VALUE #( b = 'X'`  
`c = 'A' ) ).`

## Don't align type clauses

`DATA name TYPE seoclsname.`  
`DATA reader TYPE REF TO /clean/reader.`

## Constants

Use constants instead of magic numbers

E.g. `typekind_date` instead of `'D'`

Prefer enumeration classes over constants interfaces

E.g. class `message_severity` over interface `common_constants`

If you don't use enumeration classes, group your constants

Don't mix unrelated constants in same structure

## Booleans

Use Booleans wisely

Enumerations often make more sense

Use `ABAP_BOOL` for Booleans

`DATA has_entries TYPE abap_bool` or `BOOL_D` where DDIC type needed

Use `ABAP_TRUE` and `ABAP_FALSE` for comparisons

Instead of `'X'`, space, and `IS INITIAL`

Use `XSDBOOL` to set Boolean variables

`empty = xsdbool( itab IS INITIAL )`

## Classes: Object orientation

Prefer objects to static classes

Prefer composition over inheritance

`DATA delegate TYPE REF TO CLASS a DEFINITION INHERITING FROM`

Don't mix stateful and stateless in the same class

## Variables

Prefer inline over up-front declarations

`DATA(name) = 'something'`  
~~`DATA: name TYPE char30`~~

Don't declare inline in optional branches

~~`IF has_entries = abap_true.`~~  
~~`DATA(value) = 1.`~~

Do not chain up-front declarations

`DATA name TYPE seoclsname.`  
`DATA reader TYPE REF TO something.`

Prefer `REF TO` over `FIELD-SYMBOL`

`LOOP AT itab REFERENCE INTO ...`

## Conditions

Try to make conditions positive

`IF has_entries = abap_true.`

Consider decomposing complex conditions

`DATA(example_provided) = xsdbool(...)`  
`IF example_provided = abap_true AND one_example_fits = abap_true.`

Consider extracting complex conditions

`IF is_provided( example ).`

## Classes: Scope

Global by default, local only in exceptional cases

`CLASS lcl_some_helper`

`FINAL` if not designed for inheritance

`CLASS a DEFINITION FINAL`

Members `PRIVATE` by default, `PROTECTED` only if needed

`PRIVATE SECTION.`  
`DATA attribute`

Consider using immutable instead of getter

`CLASS data_container`  
`DATA a TYPE i READ-ONLY`

Use `READ-ONLY` sparingly

`READ-ONLY`

## Tables

Use the right table type

`HASHED`: large, filled at once, never modified, read often

`SORTED`: large, always sorted, filled over time or modified, read often

`STANDARD`: small, array-like

Avoid `DEFAULT KEY`

`DATA itab TYPE ... WITH EMPTY KEY`  
~~`DATA itab TYPE ... WITH DEFAULT KEY`~~

Prefer `INSERT INTO TABLE` over `APPEND TO`

Except to express that row *must* be last

Prefer `LINE_EXISTS` over `READ TABLE`

`IF line_exists( itab[ key = 'A' ] )`

Prefer `READ TABLE` over `LOOP AT`

~~`LOOP AT my_table ... WHERE key = 'A'.`~~  
~~`EXIT.`~~

PREFER `LOOP AT WHERE` over nested `IF`

`LOOP AT my_table ... WHERE key = 'A'.`

## Ifs

No empty IF branches

~~`IF has_entries = abap_true.`~~  
~~`ELSE.`~~

Prefer `CASE` to `ELSE IF` for multiple alternative conditions

`CASE type.`  
`WHEN this.`  
`WHEN OTHERS.`  
`ENDCASE.`

Keep the nesting depth low

~~`ELSE.`~~  
~~`IF <other>.`~~  
~~`ELSE.`~~  
~~`IF <something>.`~~

## Regular expressions

Prefer simpler methods to regular expressions

`IF input IS NOT INITIAL.`  
~~`IF matches( ... regex = ',+' ).`~~

Prefer basis checks to regular expressions

`CALL FUNCTION 'SEO_CLIF_CHECK_NAME'`  
~~`pattern = '[A-Z][A-Z0-9]{0,29}'`~~

Consider assembling complex regular expressions

`CONSTANTS classes ...`  
`CONSTANTS interfaces ...`  
`... = |{ classes }|{ interfaces }|.`

## Strings

Use ``` to define literals

`CONSTANTS a TYPE string VALUE `abc``

Use `|` to assemble text

`text = |Received { http_code }|`

## Classes: Constructors

Prefer `NEW` over `CREATE OBJECT`

`DATA(a) = NEW b( ).`  
~~`CREATE OBJECT a TYPE b`~~

If your global class is `CREATE PRIVATE`, leave the `CONSTRUCTOR` public

`CLASS a DEFINITION CREATE PRIVATE.`  
`PUBLIC SECTION.`  
`METHODS constructor`

Prefer multiple static factory methods over optional parameters

~~`METHODS constructor`~~  
~~`IMPORTING`~~  
~~`— a OPTIONAL`~~  
~~`— b OPTIONAL`~~

Use descriptive names for multiple constructor methods

`METHODS create_from_sample`  
`METHODS create_from_definition`

Make singletons only where multiple instances don't make sense

`DATA singleton`

## Methods: Calls

Prefer functional over procedural calls  
~~do\_it( ).~~  
~~CALL METHOD do\_it.~~

## Omit RECEIVING

DATA(a) = do\_it( ).  
~~do\_it( RECEIVING result = a ).~~

## Omit the optional keyword EXPORTING

do\_it( a = b ).  
~~do\_it( EXPORTING a = b ).~~

## Omit the parameter name in single parameter calls

do\_it( b ).  
~~do\_it( a = b ).~~

## Methods: Object orientation

## Prefer instance to static methods

METHODS a  
~~CLASS METHODS a~~

## Public instance methods should be part of an interface

INTERFACES the\_interface.  
~~METHODS a~~

## Methods: Method body

## Do one thing, do it well, do it only

## Focus on the happy path or error handling, but not both

TRY.  
 " focus here  
 CATCH.  
 " do somewhere else  
 ENDTRY.

## Descend one level of abstraction

~~do\_something\_high\_level( ).~~  
 DATA(low\_level\_op) = |a { b }|.

## Keep methods small

3-5 statements, one page, 1000 lines

## Methods: Control flow

## Fail fast

~~METHOD do\_it.~~  
~~" some more actions~~  
~~CHECK input IS NOT INITIAL.~~

## CHECK or RETURN

METHOD do\_it.  
 CHECK input IS NOT INITIAL.

## Avoid CHECK in other positions

~~LOOP AT itab INTO DATA(row).~~  
~~CHECK row IS NOT INITIAL.~~

## Methods: Parameter number

## Aim for few IMPORTING parameters, at best less than three

~~METHODS a IMPORTING b c d e~~

## Split methods instead of adding OPTIONAL parameters

METHODS a IMPORTING b  
 METHODS c IMPORTING d  
~~METHODS x~~  
~~IMPORTING b~~  
~~d~~

## Use PREFERRED parameter sparingly

~~METHODS do\_it~~  
~~IMPORTING a PREFERRED~~  
~~B TYPE i~~

## RETURN, EXPORT, or CHANGE exactly one parameter

~~METHODS do\_it~~  
~~EXPORTING a~~  
~~CHANGING b~~

## Methods: Parameter types

## Prefer RETURNING over EXPORTING

METHODS a RETURNING b  
~~METHODS a EXPORTING b~~

## RETURNING large tables is usually okay

METHODS a RETURNING b TYPE TABLE  
~~METHODS a EXPORTING b TYPE TABLE~~

## Use either RETURNING or EXPORTING or CHANGING, but not a combination

~~METHODS do\_it~~  
~~EXPORTING a~~  
~~CHANGING b~~

## Use CHANGING sparingly, where suited

METHODS IMPORTING ... RETURNING ...  
~~METHODS CHANGING~~

## Split method instead of Boolean input parameter

METHODS do\_it\_without\_saving  
 METHODS do\_it\_and\_save  
~~METHODS do\_it IMPORTING and\_save~~

## Methods: Parameter names

## Consider calling the RETURNING parameter RESULT

METHODS sum RETURNING result  
~~METHODS sum RETURNING sum~~

## Methods: Parameter initialization

## Clear or overwrite EXPORTING reference parameters

~~CLEAR et\_result.~~

## Don't clear VALUE parameters

~~CLEAR rv\_result.~~

## Error handling: Return codes

## Prefer exceptions to return codes

~~METHODS check RAISING EXCEPTION~~  
~~METHODS check RETURNING result~~

## Don't let failures slip through

DATA(result) = check( input )  
 IF result = abap\_false.

## Error handling: Exceptions

## Exceptions are for errors, not for regular cases

RAISE EXCEPTION db\_read\_failure  
~~RAISE EXCEPTION not\_enough\_money~~

## Use class-based exceptions

METHODS do\_it RAISING EXCEPTION  
~~METHODS do\_it EXCEPTIONS~~

## Error handling: Throwing

## Use own super classes

CLASS our\_products\_static\_check  
 INHERITING FROM cx\_static\_check

## Throw one type of exception

~~METHODS a RAISING EXCEPTION b c d~~

## Use sub-classes to enable callers to distinguish error situations

METHODS do\_it RAISING EXCEPTION r  
 CLASS a INHERITING FROM r  
 CLASS b INHERITING FROM r

## Throw CX\_STATIC\_CHECK for manageable situations

RAISE EXCEPTION no\_customizing

## Throw CX\_NO\_CHECK for usually unrecoverable situations

RAISE EXCEPTION db\_unavailable

## Consider CX\_DYNAMIC\_CHECK for avoidable exceptions

RAISE EXCEPTION division\_by\_zero

## Dump for totally unrecoverable situations

~~RAISE EXCEPTION out\_of\_memory~~

## Prefer RAISE EXCEPTION NEW to RAISE EXCEPTION TYPE

RAISE EXCEPTION NEW a( ).  
~~RAISE EXCEPTION TYPE a.~~

## Error handling: Catching

## Wrap foreign exceptions instead of letting them invade your code

CATCH foreign INTO DATA(error).  
 RAISE EXCEPTION NEW my( error ).  
~~RAISE EXCEPTION error.~~

# Clean ABAP

# Testing

## Principles

### Write testable code

*There are no tricks to writing tests, there are only tricks to writing testable code. (Google)*

### Enable others to mock you

```
CLASS my_super_object DEFINITION.  
    INTERFACES you_can_mock_this.
```

### Readability rules

```
given_some_data( ).  
do_the_good_thing( ).  
and_assert_that_it_worked( ).
```

### Don't make copies or write test reports

```
REPORT zmy_copy.  
" for playing around
```

### Test publics, not private internals

```
CLASS unit_tests DEFINITION LOCAL FRIENDS
```

### Don't obsess about coverage

60% ~~→ all done!~~

## Test classes

### Call local test classes by their purpose

```
CLASS unit_tests  
CLASS tests_for_the_class_under_test
```

### Put tests in local classes

```
REPORT some_tests_for_this
```

## Code under test

### Name the code under test meaningfully, or default to CUT

```
DATA switch  
DATA cut
```

### Test interfaces, not classes

```
DATA cut TYPE REF TO some_interface  
DATA cut TYPE REF TO some_class
```

### Extract the call to the code under test to its own method

```
METHODS map_xml_to_itab  
    IMPORTING  
        xml_string TYPE string  
        config     TYPE ... DEFAULT ...  
        format     TYPE ... DEFAULT ...
```

```
METHOD map_xml_to_itab.  
    result = cut->map_xml_to_itab( ... ).  
ENDMETHOD.
```

Allows tests to focus on the parameters that are really needed:

```
METHOD some_test.  
    map_xml_to_itab( `  
ENDMETHOD.
```

## Injection

### Use dependency inversion to inject test doubles

```
cut = NEW( stub_db_reader )  
cut->set_db_reader( stub_db_reader )  
cut->db_reader = stub_db_reader
```

### Use CL\_ABAP\_TESTDOUBLE

before writing custom stubs and mocks

### Exploit the test tools

CL\_SQL\_REPLACE, CDS Test Framework, Avalon

### Use test seams as temporary workaround

They are *not* a permanent solution!

### Use LOCAL FRIENDS to access the dependency-inverting constructor if it's hidden away

### Don't misuse LOCAL FRIENDS to invade the tested code

```
CLASS unit_tests LOCAL FRIENDS cut.  
cut->db_reader = stub_db_reader
```

### Don't change the productive code to make the code testable

```
IF in_test_mode = abap_true.
```

### Don't sub-class to mock methods

Use test seams or OSQL\_REPLACE or extract the methods to own class

### Don't mock stuff that's not needed

```
DATA unused_dependency
```

### Don't build test frameworks

```
setup( test_case_id = '4711' )
```

## Test Methods

### Test methods names: reflect what's given and expected

```
METHODS accepts_empty_user_input  
METHODS test_1
```

### Use given-when-then

```
given_some_data( ).  
do_the_good_thing( ).  
assert_that_it_worked( ).
```

### "When" is exactly one call

```
given_some_data( ).  
do_the_good_thing( ).  
and_another_good_thing( ).  
assert_that_it_worked( ).
```

### Don't add a TEARDOWN unless you really need it

```
" recreated in setup anyway  
METHOD teardown.  
    CLEAR stub_db_reader  
ENDMETHOD.
```

## Test Data

### Make it easy to spot meaning

```
METHODS accepts_empty_user_input  
METHODS test_1
```

### Make it easy to spot differences

```
given_some_data( ).  
do_the_good_thing( ).  
assert_that_it_worked( ).
```

### Use constants to describe purpose and importance of test data

```
CONSTANTS some_nonsense_key ...
```

## Assertions

### Few, focused assertions

```
assert_not_initial( itab ).  
assert_equals( act = itab exp = exp ).
```

### Use the right assert type

```
assert_equals( act = itab exp = exp ).  
assert_true( itab = exp ).
```

### Assert content, not quantity

```
assert_contains_message( key )  
assert_equals( act = lines( messages )  
    exp = 3 ).
```

### Assert quality, not content

```
assert_all_lines_shorter_than( ... )
```

### Use FAIL to check for expected exceptions

```
METHOD throws_on_empty_input.  
    TRY.  
        " when  
        cut->do_something( '' ).  
        cl_abap_unit_assert=>fail( ).  
    CATCH /clean/some_exception.  
        " then  
    ENDTRY.  
ENDMETHOD.
```

### Forward unexpected exceptions instead of catching and failing

```
METHODS throws RAISING EXCEPTION bad
```

### Write custom asserts to shorten code and avoid duplication

```
assert_table_contains( row )  
READ TABLE itab  
assert_subrc( )
```