|  |
| --- |
| 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 of country |
| Use pronounceable names |
| detection\_object, ~~dobj~~ |
| Avoid abbreviations |
| customizing, ~~cust~~ |
| Use same abbreviations everywhere |
| dobjt, ~~dot, dotype~~ |
| 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~~ |

Clean ABAP

**General + Comments + Formatting**

|  |
| --- |
| 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 or index = index + 1  Instead of ADD 1 to index |
| Avoid obsolete statements |
| ~~MOVE 42 to b.~~ |
| 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~~  ~~" nor 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 |
| Be consistent |
| Same style throughout a project |
| Optimize for reading, not for writing |
| DATA: a  ~~,~~ b. |
| Use the Pretty Printer before activating |
| Use your Pretty Printer team settings |
| 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. |

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| --- |
| Constants  **Variables + Statements + Classes** |
| 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 |

Clean ABAP

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| --- |
| 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 … |

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| --- |
| 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'. |

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| --- |
| Strings |
| Use ` to define literals |
| CONSTANTS a TYPE string VALUE `abc` |
| Use | to assemble text |
| text = |Received { http\_code }| |
| Booleans |
| Use Booleans wisely |
| Enumerations often make more sense |
| Use ABAP\_BOOL for Booleans |
| DATA has\_entries TYPE abap\_bool or BOOLE\_D where DDIC type needed |
| Use ABAP\_TRUE and ABAP\_FALSE for comparisons |
| Instead 'X', space, and IS INITIAL |
| Use XSDBOOL to set Boolean variables |
| empty = xsdbool( itab IS INITIAL ) |

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| --- |
| 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 ). |

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| --- |
| 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>.~~ |

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| --- |
| 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 }|. |

|  |
| --- |
| 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 |
|  |

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| --- |
| 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 |

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| --- |
| 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 + Exceptions**

Clean ABAP

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| --- |
| 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, o~~ne 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.~~ |

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| --- |
| 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.~~ |

|  |
| --- |
| 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!~~ |

**Testing**

Clean ABAP

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| --- |
| 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( `<xml></xml>` ).  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\_OSQL\_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\_emtpy\_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\_emtpy\_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( )~~ |