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ABAP Developer Cheat Sheet, Daily Reference

Internal tables · Open SQL rules · ALV skeleton · Debugging · Modularization · FAE vs JOIN

EXTRA BONUS

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01 Internal Table Types

Type	Access	Best for
STANDARD	Index + key linear search	Sequential processing, appending, order matters
SORTED	Index + key binary search	Repeated key lookups, need order kept automatically
HASHED	constant time	Large lookup tables, unique key, no index needed

```
DATA lt_std TYPE STANDARD TABLE OF mara.
DATA lt_srt TYPE SORTED TABLE OF mara
WITH UNIQUE KEY matnr.
DATA lt_hsh TYPE HASHED TABLE OF mara
WITH UNIQUE KEY matnr.
```

Rule:
looking up by key more than once in a loop? Use SORTED or HASHED
Never READ TABLE a large STANDARD table repeatedly.

02 Open SQL — Top 5 Rules

01 Never SELECT *
name only the fields you use. On HANA this matters even more, columns are stored separately.

02 Never SELECT inside a LOOP.
10,000 iterations = 10,000 database calls. Use JOIN or FOR ALL ENTRIES instead.

03 Always give a WHERE clause
using indexed fields — and always include MANDT logic where relevant.

04 Aggregate in the database.
Use SUM / COUNT / GROUP BY in SQL, not a LOOP with a running total in ABAP.

05 Never SELECT ... ENDSELECT
always INTO TABLE. One round trip instead of thousands.

```
" Slow — N+1 problem
LOOP AT lt_head INTO ls_head.
SELECT * FROM vbap WHERE vbeln = ls_head-vbeln.
ENDLOOP.

" Fast — one call
SELECT vbeln, posnr, matnr FROM vbap
INTO TABLE @lt_item
FOR ALL ENTRIES IN @lt_head
WHERE vbeln = @lt_head-vbeln.
```

03 ALV Report Skeleton

```
TRY.
cl_salv_table=>factory(
IMPORTING r_salv_table = DATA(lo_alv)
CHANGING t_table = lt_data ).

lo_alv->get_functions( )->set_all( ).
lo_alv->get_columns( )->set_optimize( ).
lo_alv->display( ).

CATCH cx_salv_msg INTO DATA(lx).
MESSAGE lx->get_text( ) TYPE 'E'.
ENDTRY.
```

+ Column heading: get_columns( )->get_column('MATNR')->set_short_text( )

+ Layout save: get_layout( )->set_key( ) then set_save_restriction( )

+ Sort: get_sorts( )->add_sort('MATNR')

Use CL_SALV_TABLE, not REUSE_ALV_GRID_DISPLAY. The old function module still works but signals dated skills in a code review.

04 Debugging — 7 Essentials

/h	**Activate debugger —** type in the command field, press Enter, then run the transaction
F5	**Single step —** step into the next statement, including inside calls
F6	**Execute —** run the call and stop after it, without stepping inside
F7	**Return —** finish the current routine and stop at the caller
F8	**Continue —** run to the next breakpoint or to the end
Watch poin	**Stop when a variable changes —** The fastest way to find where a value gets corrupted
JDBG	**Debug a background job —** in SM37, select the finished job and type JDBG in the command field

Breakpoint at Statement is underused — set a breakpoint at MESSAGE to catch where an error is raised without knowing the program.

05 Modularization — What To Use

Use	When	Verdict
CLASS METHOD	Default for everything new. Unit testable, encapsulated, inheritable.	Always start here
FUNCTION MODULE	Only when you need RFC, IN UPDATE TASK, or an SAP framework demands it.	Only if required
INCLUDE	Structuring one large report, or shared TYPES and CONSTANTS.	Never for reuse
FORM ENDFORM	Reading legacy code only.	Never write new

```
CLASS zcl_order_check DEFINITION PUBLIC.
PUBLIC SECTION.
METHODS validate
IMPORTING iv_vbeln TYPE vbeln
RETURNING VALUE(rv_ok) TYPE abap_bool
RAISING zcx_order_error.
ENDCLASS.
```

06 FOR ALL ENTRIES vs JOIN

JOIN
Runs as one statement in the database
Preferred on HANA — full pushdown
Keeps duplicates unless you use DISTINCT
Cannot cross systems or clients
Watch for cartesian products

The two traps that cause real bugs:

1. Empty driving table selects the entire table. Always guard it.

2. FAE removes duplicate rows from the result. If your field list is missing the full key, rows silently disappear.

```
IF lt_head IS NOT INITIAL. " never skip this
SELECT vbeln, posnr, matnr " full key included
FROM vbap INTO TABLE @lt_item
FOR ALL ENTRIES IN @lt_head
WHERE vbeln = @lt_head-vbeln.
ENDIF.
```

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Bonus — Modern ABAP, dump decoder, and standard classes worth knowing

If you still write ABAP like it is 2012, this page is the upgrade · 7.4+ syntax · 2026

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Modern ABAP — old vs new

7.4+ syntax every reviewer expects now

Inline declarations
Old: DATA lv TYPE i. lv = 1.
New: DATA(lv) = 1.

Inline SELECT target
SELECT ... INTO TABLE @DATA(lt_mara).
No separate DATA declaration needed. Note the @ escape.

Table expressions
Old: READ TABLE lt INTO ls WITH KEY id = 1.
New: ls = lt[id = 1].
Raises an exception if not found — guard with line_exists( )

VALUE constructor
lt = VALUE #((id = 1) (id = 2)).
Build a whole table in one statement.

COND and SWITCH
DATA(x) = COND string(WHEN a = 1 THEN 'A' ELSE 'B').
Replaces 5-line IF blocks with one expression.

REDUCE and FILTER
DATA(sum) = REDUCE i(INIT s = 0 FOR wa IN lt NEXT s = s + wa-amt).
DATA(lt2) = FILTER #(lt WHERE status = 'A').

String templates
DATA(msg) = |Total { lv_count } items|.
Replaces CONCATENATE entirely.

Loop with field-symbol
LOOP AT lt ASSIGNING FIELD-SYMBOL(<fs>).
Faster than INTO — no copy on every row.

ST22 dump decoder

what the error actually means

CX_SY_ITAB_LINE_NOT_FOUND
A table expression lt[...] found nothing. Fix: wrap in line_exists( ) or use TRY/CATCH.

OBJECTS_OBJREF_NOT_ASSIGNED
Calling a method on an object reference that is still initial. Fix: check IS BOUND first.

CONVT_NO_NUMBER
Trying to move a non-numeric character string into a numeric field.
Usually bad input data from a file or interface.

TSV_TNEW_PAGE_ALLOC_FAILED
Memory exhausted. An internal table grew too large. Fix by packaging the SELECT or processing in blocks.

TIME_OUT
Dialog process exceeded the runtime limit. Move it to a background job — do not just ask Basis to raise the limit.

SAPSQL_ARRAY_INSERT_DUPREC
INSERT tried to write a key that already exists. Use MODIFY, or delete duplicates before insert.

MESSAGE_TYPE_X
Someone raised a deliberate abort. Look at the message class and number in the dump — the real cause is upstream.

CALL_FUNCTION_NOT_FOUND
FM does not exist in this system. Usually a missing transport — check the object is in the right request.

Code review checklist — before you release the transport

- **SY-SUBRC checked** — after every SELECT, CALL FUNCTION and READ TABLE
- **No SELECT *** — and no SELECT inside a LOOP anywhere
- **FOR ALL ENTRIES guarded** — with IS NOT INITIAL and full key in the field list
- **ATC run and clean** — every exemption documented with a reason
- **No hardcoded values** — use CONSTANTS or a config table
- **AUTHORITY-CHECK present** — where the data is sensitive
- **Lock objects used** — before any update to shared data
- **Error messages are specific** — never "An error occurred"
- **Dead code removed** — no commented-out blocks left behind
- **All dependent objects** — are in the same transport request

Standard classes & FMs

stop rewriting what SAP already gives you

CL_SALV_TABLE
Modern ALV. Grid, list, and hierarchy variants available.

CL_GUI_FRONTEND_SERVICES
File upload and download, directory browse, open file dialog. Replaces GUI_UPLOAD / GUI_DOWNLOAD.

CL_SALV_TABLECL_ABAP_CHAR_UTILITIES
Constants for newline, tab, horizontal separator. Stop hardcoding cl_abap_char_utilities=>cr_lf.

CL_SYSTEM_UUID
Generate GUIDs properly instead of building your own key logic.

CL_BCS / CL_DOCUMENT_BCS
Send email with attachments. The modern replacement for the old SO_* function modules.

CL_SALV_TABLECL_ABAP_MATCHER
Regular expressions in ABAP. Far cleaner than nested string operations.

CONVERSION_EXIT_ALPHA_INPUT / OUTPUT
The leading-zeros problem. Material and customer numbers stored with leading zeros — this converts both directions.

ENQUEUE_ / DEQUEUE_ objects
Lock objects before updating. Skipping locks is how two users overwrite each other silently.

READ_TEXT
Read SAPscript long texts — order texts, material texts, customer notes.

Performance toolbox

the transactions that find the problem

ST05 — SQL trace
Always start here. Shows every database call, duration, and whether an index was used. Identical statements repeating = your N+1 problem.

SAT — runtime analysis
Shows where ABAP time is spent, not DB time. Use when ST05 looks fine but the program is still slow.

ST12 — combined trace
ABAP and SQL trace together, and can trace another user's session. The one senior consultants reach for first.

SQLM — SQL monitor
Records real production SQL over days. The right tool before an S/4HANA migration — finds what actually runs, not what you think runs.

ATC — code quality
Run before every transport. Catches performance, security and clean-core problems automatically.

SM50 / SM66 — process overview
See what is running right now and which process is stuck. You can also attach the debugger to a running process from here.

DB02 / HANA Cockpit
Table sizes and growth. Useful to check whether the table you are about to full-scan has 10k rows or 50 million.

ABAP Unit test skeleton

Inline declarations

```
CLASS ltcl_test DEFINITION FOR TESTING
DURATION SHORT RISK LEVEL HARMLESS.
PRIVATE SECTION.
METHODS setup.
METHODS test_valid FOR TESTING. ENDCLASS.

CLASS ltcl_test IMPLEMENTATION.
METHOD test_valid.
cl_abap_unit_assert=>assert_equals(
act = cut->calculate( 2 )
exp = 4 ).
ENDMETHOD. ENDCLASS.
```

Run with Ctrl+Shift+F10 in ADT. Tests are the fastest way to prove your fix works without running the whole transaction.

Performance red flags in a code review

- **SELECT inside LOOP** — the single most common cause of slow ABAP
- **Nested LOOP over two large tables** — sort and use a parallel cursor, or use a HASHED lookup table
- **READ TABLE on a big STANDARD table** — repeatedly — switch to SORTED or HASHED
- **MOVE-CORRESPONDING inside a large loop** — measurable overhead at scale
- **SELECT with no WHERE** — on a transactional table — check the row count first in DB02
- **APPEND then SORT then DELETE ADJACENT DUPLICATES** — often a SORTED or HASHED table from the start is cleaner and faster
- **Aggregating in ABAP** — what SQL could do with GROUP BY in the database

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