

**Free Method Foundation
OO Tool [OoaTool^{almost}Free]
The MultiNotational OO Documentation Tool
Release 1.03
Copyright Roman M. Zielinski 1992**

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1 About this release

(This chapter is quite long. Print it if you want.)

This is the first release of the FMF OO Tool (Release 1.0). See below for information about the changes introduced in the maintenance releases 1.xx.

Limitations:

- + the tool does not work under some MS Windows 3.1 beta releases, however I've been promised by a guy with Microsoft that it will work with the official win 3.1. However, I am looking for a win 3.1-beta. (The tool refuses to show the menus!).
- + only OOA-notation (Coad/Yourdon) is supported
- + no *subject filtering* of what is presented (i.e. the objects are not grouped into subject areas) However you will get the same effect by entering different subjects into different files. Via Import/Copy Object you can create links to other object files or just copy the object to your current file. (Coad is somewhat not clear if an object may participate in many subjects, but our import function is powerful enough!).
- + printing accuracy differs from that on the screen, so some texts and connectors appear differently on the paper
- + strategy to draw connectors is rather simple so sometimes the lines are somewhat non-optimal, and may need some manual help.
- + Names of objects, attributes and services are limited to 32 characters, while description texts for objects, attributes, services, associations are limited to 1500 characters. This is a memory economy constraint. In reality during the modelling work the limit is seldom reached.

The *next releases* will probably contain:

- + multiple document interface (to allow simultaneous access to more than one sheet)
- + support OMT (Rumbaugh-Blaha-Premarlani-Eddy-Lorensen) notation
- + notation for state diagrams
- + *scenario* and *use case* diagrams
- + support for object oriented design, i.e. documentation of the transiting from analysis models to design models containing processors, processes, data bases, user interfaces, etc
- + support of user customizable notation
- + customizable printout headings
- + draft printing (to speed up slower printers)
- + analysis of your model, critics, hints, warnings...
- + utilities for revision control and configuration management

- + write me a letter if you have good ideas

Change History

Releases 1.00 and 1.01 were only used for beta test purposes and were spread restrictly.

Release 1.02 was the first comercial release of the product.

Releases 1.03 contains same functionality as 1.02. Changes were introduced into areas:

- + after multiple move objects remain selected (deselect by selecting a simple object or clicking outside objects).
- + multiple move; objects can be added/removed to/from the group of objects to be moved
- + more restricted refresh of screen when selecting/deselecting objects (less flicker)
- + bug fix: you cannot any longer *lose* objects by moving them outside the left or top document margin.
- + bug fix: the tool does not any longer prepend a space in front of attribute and service names

New functions in 1.03:

- + inheritance filtering (to show which attributes and services an object contain) available via SHIFT+Right Mouse Button or menu
- + screen zoom function to see a lager part of the sheet on the screen, the function is invoked by pressing the right mouse key.
- + selective printing of object graphics, i.e. only the selected objects and associaition between them are printed

Copyrights

The OO Tool is written in Borland C++ 2.0 using Whitewater Resource kit. The original idea and design are entirely by Roman Zielinski **without any stolen** impressions from other tools like Coad's *OOATool* (tm).

Copyright (parts):

Copyright **Borland Intl** (C++)

Copyright **Microsoft** (windows environment, WinHelp, OpenFile/SaveAs-dialogues with some smaller adaptations)

Copyright **Whitewater Group Inc** (Resource Tool Kit)

Copyright **Roman M. Zielinski** (Windows Classes "WinClass")

Copyright **Roman M. Zielinski** (OO Documentation Tool, help file, user interfaces, design & implementation)

Tanks

Tanks to my beta-testers and users who gave me lot of good ideas and helped to find the last bugs and to improve the behaviour of the product..

Some more words...

The best way to stimulate me to further improvements is to show me that people are using my tools. So give me your feed-back!

Open file format

The tool uses an open format for storing information. The files are simple line oriented ASCII files.

System Requirements

386 or 386-SX with 4MB is recommended (286 works fine too).

Mouse is required.

Colour VGA is recommended.

Printer with graphical possibilities (9-pin, 24-pin, InkJet, Laser...) recommended.

You should have at least 6...10 megabytes free disk space for windows swap and for the spool files. Print files can be some megabytes long (formatted graphics+text) - don't blame me, it's High Tech (?)

During the stability testing the tool had been tested with more then 130 objects in a single file. The size of corresponding file.OOT was then over 180,000 bytes.

2 License & Fee

(This chapter is quite long. Print it if you want.)

This version is distributed as **shareware**. It means that a user may freely distribute the **unmodified** copies of the product to other persons. You are not allowed to take any charge for the distribution, except the cost for a distribution medium. The users may evaluate the product during **four (4) weeks without any charge**. After the evaluation period, if the user wishes to continue using the tool, she/he is expected to pay the symbolic registration fee:

free (\$0!) for university students and *non-commercial* education purposes. But please register!

US\$50 or 300 SEK non-commercial *home* users

US\$150 or 900 SEK others, including any use in all kinds of courses/seminars/workshops with a course fee, any use in development projects, etc. License covers max 5 simultaneous users.

US\$1500 or 9000 SEK source code license. The source code license allows you to unlimited use and modify the software. The kit contains full source code and Software Design Description and object descriptions. (The kit will be available in april 92).

Users in Sweden please add the current tax (*moms*) when sending the fee.

Please contact the author for an agreement for site licenses, distribution license or a source code license.

Support is only given to licensed users. Registered users will be informed about availability of new releases of the product and large version updates. They may upgrade to a newer release for a reduced fee.

Any use, not following the above regulations, is to be seen as a copyright violation, and also against the law and international agreements. It's also not honest. Don't forget that I'm saving you up to \$1000 with my tool!!! Future releases are also to some extent depending on your support. I'm trying to prove that good professional software can be cheap.

Cheques, payable in Sweden, are to be transferred to the author:

Roman Zielinski,

**Tors väg 5
S-145 71 Norsborg
Sweden**

(You can also direct your payment to my Swedish PostGiro account 436 78 78-8).

Evaluation copies of the product may also be ordered from the above address. Send me your address, info about diskette type + 50SEK (distribution in Scandinavia) or US\$15 (distribution to rest of the world). This fee (50SEK/\$15) just covers distribution and copying costs, and is not to be seen as the license fee.

New versions of the tool may be required from the author, or from SIMTEL-20, garbo@uwasa.fi, or other data bases for public domain software and shareware.

Registration Form:

Please send me the following registration data:

Name (or Company Name + name of a contact person),

Mailing Address,

Licence Type:

- Student Licence** (free), Please specify your age and name + address of the School
- Non-Commercial Home User Licence**, enclose cheque
- Commercial User Licence** (specify how many 5-users licences), enclose cheque

Specify Your equipment (optional information), e.g.: PC model, CPU type 286/386/386SX/486/486SX, windows release, memory size, printer type.

E-mail address (optional)

Specify if you need a signed license agreement from me (fee 120SEK or US\$20. [in Sweden: add moms]).

3 Why yet another OO tool?

To be honest, I did not like to pay \$1,000/13,000SEK (why is a US\$ twice as expensive at ENEA DATA AB marketing the tool in Sweden as in a bank?) for Coad's *OOATool* (tm), and the \$50 demo version was too constrained (max 15 objects).

And I also needed a cheap tool for the notation/methods I use...I work as a professional system architect and consultant sine lot of years, and was quite upset about the unfriendly pricing for some methods and tools licenses/fees. So you can see this tools as:

- + an attempt to prove that good professional software can be very cheap
- + help all analysts and designers to work methodic

Please observe my tool's name: **MultiNotational OO Documentation Tool**, or shortly

OO Tool, [or OoaToolFree].

The tool will be *MultiNotational* when I implement some more code. This version covers just Peter Coad's notation as described in his superb OOA and OOD books (read them!).

Free Method Foundation - well it does not exist yet... But when we have FSF, why not FMF?

I would like to get people to be more methodic. Artistry is not always sufficient...

Apropos constraints, the OO Tool is capable to handle lot of objects, in my stability tests I've verified the functionality with over 100 objects on a single sheet!

4 How to Use the OO tool?

(This chapter is quite long. Print it if you want.)

The chapter contains a short introduction. Read it first, then continue with the more detailed rest of the Help file.

It's simply.

Just use your mouse and click-click-click....The most of job is done by clicking on objects. The tool presents some dialogue boxes when it need some data from you. Some non frequent tasks are invoked by using the menus.

The OO Tool generates some warning and error messages if it cannot perform the requested function or something happened that concerns the user.

File access

The OO Tool stores all the information about your objects in ASCII files. The Menu FILE contains choises NEW, OPEN, SAVE and SAVE AS. The suffix .OOT is *proposed* as for file names.

The OPEN menu clears the contents of the work sheet (after warning you of cause) and reads a file.

The menu SAVE and SAVE AS allow you to store contents of the work sheet to disk.

Autosaving

The tool has a autosaving facility, activated every **10th minute** and in case there was a modified file in the OO tool, it will be saved into a file **AUTOSAVE.OOT**. If you crash windows or do a mistake, examine always this file. To restore its contents just OPEN it from the OO Tool and use the FILE, SAVE AS menu to store under another file name. (If the tool fails to start the autosaving process, it will inform you during start of the tool -. the reason is that another application has started too many timers in windows).

Configuration

Some optional configuration is performing via WIN.INI, some via the menu FILE, CONFIGURE. Colours of objects and connectors may be modified via FILE.COLORS or by editing WIN.INI.

Creating Diagram

Use the menu NEWSYMB, OBJECT to create new objects. Double-click on the object's top rectangle containing the name to edit the object characteristics.

Alternatively you may copy an object from another file, by NEWSYMB, IMPORT/COPY,.

Newly created objects are always located on a predefined location. Move them to desired location, unless the next created objects will be located above the object.

Move the object by dragging with the mouse. Move a group of objects by selecting them by CTRL-left-click and then move the group of objects to new location (multiple move). See also Moving objects.

To assign or edit attributes or services double-click on the middle or lower rectangle of the object.

Create/edit associations by selecting (by double clicking) an object (it's black) and pointing out another by SHIFT+left button up.

An optional title can be assigned by NEWSYMB, TITLE.

Click, click, click...

Left mouse button:

single click select object

double click invoke object/attribute/service dialogue box

SHIFT + click left mouse button select the other object to be connected

CTRL + click left mouse button select the object for multiple moving, i.e. moving together with other selected objects

press the left mouse button + drag move object(s)

press the right mouse button zoom the document (3 times horisonally and vertically, i.e. 9 times larger view)

release the right mouse button leave zoom mode

SHIFT + click right mouse button show inherited attributes and services

View

The menu VIEW controls what is presented on the screen. Convention follow Peter Coad's definitions.

Printing

Printing is ordered via the menu FILE, PRINT. What is printed is defined by checking in a dialogue box.

Printing uses a unique zooming function.

Help

You are reading the help file, so you should know that there is one. I put some words in the SEARCH index, maybe you find what you are looking for...

About

Every Windows program must have an About... It's about the author and the OO Tool.

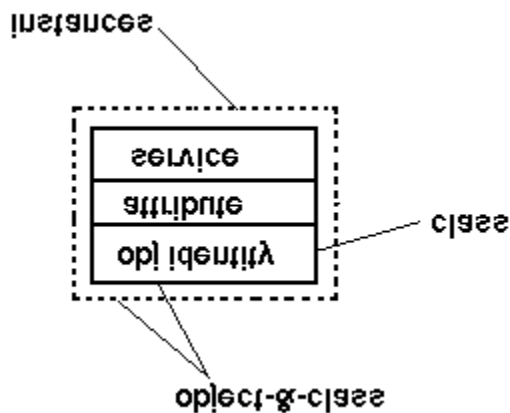
5 Basic Definitions

(This chapter is quite long. Print it if you want.)

Objects

Every object has is represented as a rectangle divided by two horizontal lines into the following parts:

- + *object identity part* (upper)
- + *attribute part* (middle)
- + *service part* (lowest)



An optional dash-dot line around the object rectangle indicates that the object represents a set of instances.

By **double clicking** on a proper part you may operate on entities of the selected part.

The object identity part contains a name of the object, a descriptive text and type of the object (object-&-class or class).

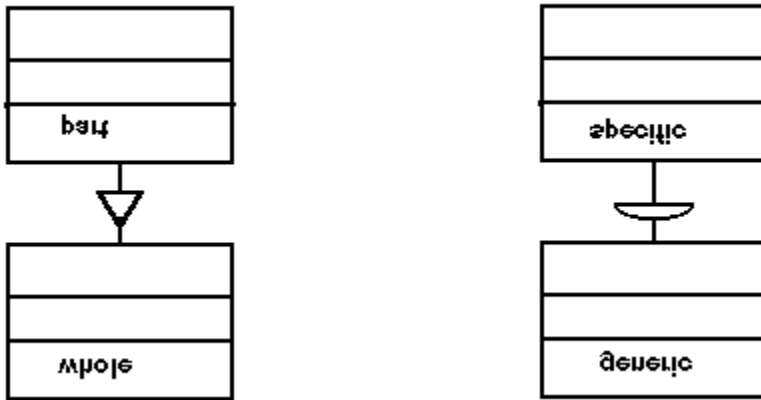
Connectors and Associations

Two objects may be associated by a *connector*. They can be of type gen-spec, whole-part, instance-to-instance, message connections

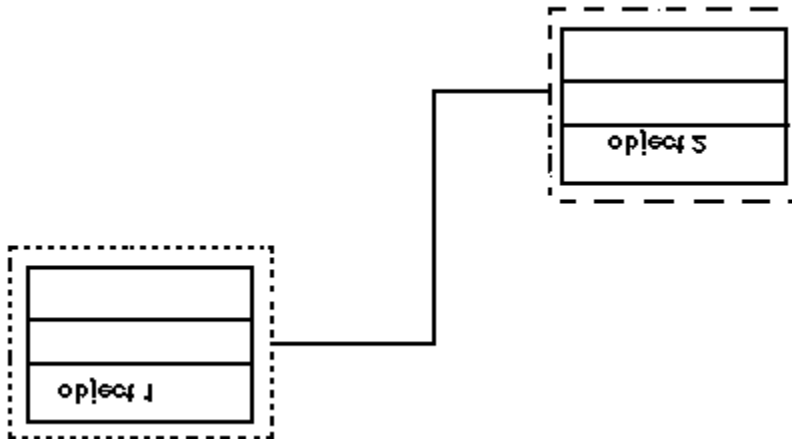
In the *gen-spec* association the generic object contains common properties of some objects, while the specific object contains the unique properties.

In the *whole-part* association the whole part contains (or keeps track) on its parts.

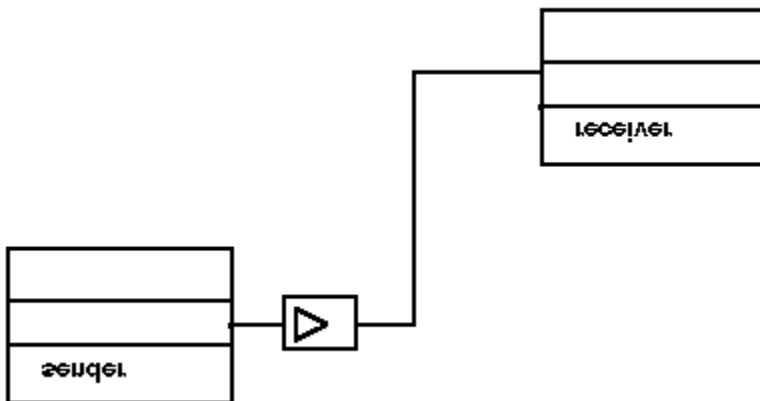
The gen-spec and whole-part associations are structure associations and thus operated by the Structure flag in the View menu.



In the *instance-to-instance* associations, object instances know about each other in some way (e.g. by keeping track on each others identities or addresses). The association is a attribute level association and thus operated by the Attribute flag in the View menu.



In the *message* associations, objects can exchange messages. This association is not a structure association but a service level association. Thus you require to see it by the Services flag in the View menu.



Note that in general the two objects involved into a connection have different roles, so keep track on who is who when connecting them.

6 Creating an Object

Use the menu NewSymbol, Object. The tool will involve a dialogue box where you specify name, type of the object and give a short description (max 1500 characters including the new line characters).

The text entered into the description box is automatically rendered. To force a line break, press CTRL+ENTER.

After leaving the dialogue box, the created object is on a predefined pixel address on the screen, thus you should move it to a better place, unless the next object will be located on the same position.

7 Importing/Copying an Object

Instead of entering an object manually as described in [Create Object](#), you may fetch an existing object from another file. The menu NEWSYMB, IMPORT/COPY OBJECT invokes a dialogue box in which you select the file to copy from, and the desired object. Both the file and the object are selected from a list. By pressing on the button COPY the object and all its attributes and services will be transferred to your sheet. After copying you may modify the object however you need. Note that no associations are copied. If the copied object have a name that already is in use, it will be automatically renamed by appending ":0" to the name (if such a name exists, OO Tool will try with ":1" etc. until it finds a free name.

The function import, also invoked via the menu NEWSYMB,IMPORT/COPY OBJECT, is quite similar with respect to the user interface. You have to press the button IMPORT. Importing means that you 'copying' contents of an object from another file, but the OO Tool will remember in which file there is the original object, so next time you open the sheet, it will also fetch the newest version of the object. Because you do not have the original object in your file, you are not allowed to modify it. If you invoke dialogue boxes to examine contents of the imported object, in all captures you will find a text "[Read Only]". Due to some limitations in the OO Tool you may change text in edit controls *on the screen* but you are not able to put the into the database.

The import function allows you to reuse existing standard objects and also to design the subjects by reusing objects from other subjects.

Imported objects may be deleted from the sheet as other objects.

N.B. If you delete an object in the file you import from, or even you delete the whole file, all references from other files trying to fetch the objects inside will of cause fail. In such a situation OOT, when it tries to import the object, will inform you about the error, and will create an empty object, it is still read only, in case you correct the fault by correcting the imported file, everything will be fine.

8 Updating an Object

To move an object just move the mouse to the object's object identity part, press the left mouse button, drag to the wanted position and release the mouse button. Note that the menu File, Configure allows you to introduce some constraints for locations where objects may reside.

To view and/or change the name, type of the object and/or the descriptive text, just double click on the object identity part. The tool will invoke a dialogue box, the same as used during creation.

An object may also be deleted by pressing DELETE. All connectors to/from that object will also be removed. The action cannot be un-done.

Imported objects are in Read Only state. Any change of contents of the edit controls will not be entered to the object. But you still can delete the object.

9 Moving Objects

To move a single object, select it by clicking on the objects part of the object box (object name). If the object already is selected, you do not need to click on it gain of cause. Then drag (i.e. keep left button pressed and move the mouse) to a new location.

To move a group of objects (multiple move), select every object to be moved by pressing CTRL and clicking on the object name. When all desired objects have been selected, drag the whole group to new locations. To cancel the multiple selection, just click (without CTRL) on any object or on the white space outside objects.

It is possible to deselect an individual object selected for multiple move, by pointing with the mouse cursor on the object and pressing CTRL + left button .

Limitation: Max 30 objects may be moved by the group (multiple) move function.

In both cases you will see phantom boxes guiding you to a new location.

10 Adding/removing/editing attributes

To invoke a dialogue box for attributes, just double click the attribute part. The dialogue box will present a list of currently defined attributes for the object. By clicking on such an attribute you may see the assigned description. The description may be edited.

To add a new attribute just press the NEW button and modify name and description of the attribute.

By pressing the DELETE control button the attribute will be removed. by writing an new attribute name it will be created.

Imported objects are in Read Only state. Any change of contents of the edit controls will not be entered to the object.

11 Adding/removing/editing services

To invoke a dialogue box for services, just double click the service part. The dialogue box will present a list of currently defined services for the object. By clicking on such a service you may see the assigned description. The name and description may be edited. To add a new service just press the NEW button and specify a new name and description.

By pressing the DELETE control button the service will be removed. by writing an new attribute name it will be created.

Imported objects are in Read Only state. Any change of contents of the edit controls will not be entered to the object.

12 Adding Connectors

Associations between objects are implemented as connectors.

Select one object by clicking on its object identity part. If it is black you do not need to click on it again. The second object is selected by pressing SHIFT and left mouse button when mouse points on its object identity part.

The first object will be the 'generic', 'whole' or 'message sender'. The second is 'specialisation', 'part' or the 'message receiver'.

In the dialogue box you may define a new connector by pressing the NEW button. Modify the type of connection and also add some descriptive text.

Any connection listed in the list control box can be edited.

To reverse direction of an association press REVERSE button. It lets the whole and the part object to change roles. (The same for gen-spec and message associations).

13 Views

Via the menu View you can operate on the flags for:

Structure

When the Structure flag is checked, the diagram will also show all structure associations, i.e. gen-spec, whole-part and instance associations (see [Basic Definitions.](#))

Attribute

When the Attribute flag is checked, the diagram will show in the attribute part of the object boxes the names of attributes.(see [Basic Definitions.](#))

Service

When the Service flag is checked, the diagram will show in the service part of the object boxes the names of services. It also shows all the message associations.(see [Basic Definitions.](#))

14 Title

Via the menu NewSymb, Title you can define and/or change a title heading to a diagram. It is also presented on printout of the graphics. The location of the title is fixed and cannot be customized or changed.

Please be aware that texts are presented with smoothly different dimensions on the screen and on the printer. So some times a text on the printer will be longer and thus it can be overlaid by an object box.

15 Utilities

Via the menu Utilities you will be able to access a set of utilities. In this release there is only one function: Show Inheritance.

Select an object or object-&-class and invoke the utility 'Utility, Show Inheritance' or press SHIFT+Right Mouse Button. The tool tracks gen-spec connectors from the selected object and collects all the attributes and services available for the object.

The used presentation format is: `<objectName>::<attributeName>` or `<objectName>::<serviceName>`. (as in C++).

16 Printing

The menu File Print formats the graphic diagram and object descriptions for your printer. The dialogue box contains a set of flags where you can define what kind of data is to be printed. For increased flexibility the dialogue box contains also a list of all defined objects.

Graphics, if checked the graphics will be printed

All objects in graphics, if checked all objects are printed, if NOT checked, only those objects selected in the object list are printed. The heading will then contain the word "(selection)" to inform the reader that it's not the entire graphic sheet.

Object Descriptions, if checked there will be a printout of the verbal descriptions of the selected objects. The flag also controls presence of descriptions in the list of *associations*.

Attribute Descriptions, if checked, the attributes for the selected objects will be printed with the verbal descriptions.

Service Descriptions, if checked, the services for the selected objects will be printed with the verbal descriptions.

List of Associations, if checked, the printout will contain a list of ALL connections between objects. If also the *Object Description* flag is checked, every association will be accomplished by its verbal description.

By clicking on the list you can select single objects, by dragging over some object names you select suites of objects, by pressing CTRL when clicking/dragging you may add/remove more objects etc. (it's a standard behaviour of Window's multi selection lists).

In this release you may adjust the printed size by a zoom parameter. High zoom values enlarge the printed symbols. The zooming can allow you to print quite complex diagrams on a single paper sheet.

The graphic diagram can be printed in two ways:

- + whole diagram, check the "Graphics" and "All objects in graphics" flags in the print dialogue
- + selective diagram, set the "Graphics" flag and remove the check mark for "All objects in graphics" and select the required objects in the list of objects. The print out will filter out only the required objects and associations between them.

All printing is going to a single logical sheet which may consist of many physical pages. If your printout is larger than a single sheet, zoom it down or tape together the printed pages. The tool prints pages in the following order, example for a sheet needing 3 horizontal times 2 vertical pages:

p1	p2	p3
p4	p5	p6

Recommended zoom values for a 9-pin printer (Epson FX-85) are 2. For laser printers you

should try 3 or 4. To generate large printouts use any higher zoom values (it will be many papers...)

Choosing 1 you may get a microscopic printout, which may be readable...try it on your printer.

On some printers the printing quality can be improved by installing Adobe Type Manager tm (ATM)

If your printer supports limited number of colors, you may need to change some of the colors to get them visible (printer driver may decide to print some pale colors as white.).

17 Clipboard

Clipboard is a standard feature in windows to transfer data between programs.

Graphics

By using the menu Edit, Copy the whole graphic sheet will be copied to the clipboard.

It can be pasted to any application supporting the Windows MetaFile format (e.g. Microsoft Word For Windows).

You *cannot* paste graphics **into** the OO tool.

Text

Text entered into description boxes for object, can be copied to another boxes or application by the usually selecting and pressing CTRL-INS (copy) or SHIFT-DEL (cut) and pasted by pressing SHIFT-INS in any edit area.

18 Colours

Via the menu FILE, COLORS you may modify colors of all objects. Colours are set by adjusting the Red, Green and Blue components. Which colors you may generate depends on capabilities of your screen driver.

Button OK saves all settings, CANCEL leaves the dialogue without saving settings, DEFAULT reloads standard set-up colors.

Colours, like the other configuration parameters, are also saved into the WIN.INI file when leaving the OO Tool.

19 Configuration Parameters in WIN.INI

(This chapter is quite long. Print it if you want.)

The OO tool reads the windows parameter file WIN.INI (normally installed in the directory C:\WINDOWS).

The following tags are read (the text is *not* case sensitive), default values are specified below after the equality sign. The not specified parameters will be set to default values every time the tool is started.

All parameters except **Home** are verified when starting the OO Tool. If something fails, you will get an error message. But if you spelled wrong any parameter tag, the tool will assume that a default value is to be used.

When you exit the OO Tool, you will get a question whether to update WIN.INI with the current settings. The question comes even if you had not changed anything. But please observe that if you just switch off your system, or crash, WIN.INI will keep your old settings (of cause if win has not got one of these exclusive *coque-eye* moments...).

```
[OoaToolFree]
Home=C:\
PrinterZoom=3
GridX=5
GridY=5
FixedObjBoxWidth=0
TemplateObj=
TemplateAttr=
TemplateServ=
TemplateConn=
ColorObjBox=R000,G000,B255
ColorObjInstance=R255,G000,B000
ColorConnGenSpec=R050,G150,B050
ColorConnWholePart=R050,G055,B150
ColorConnInstance=R000,G000,B000
ColorConnMessage=R150,G150,B150
```

[OoaToolFree]

This tag identifies the section of win.ini file accessed by the OO tool. It must be within the braces.

Home=C:\ (any path)

Here you can specify the default location of your files. Dialogues for opening and saving file are using this directory as starting position. Max 80 characters. **The path must end with a back-slash.**

PrinterZoom=3 (range: 1..10)

The parameters adjust the size of your printouts. They specify how many printer pixels are going for a screen pixel. The parameters allows you efficiently zoom the size of printouts (Unique feature!?).

Recommended X,Y values for 9-pin printers (e.g. Epson FX-85) are 2, while most laser printers require 3...5. Inkjets Brother HJ-100/Canon BJ-10e (360DPI) create quite good quality with a value 3. The parameters may also be modified via the menu FILE, PRINT

GridX=5 (range: 1..100)

GridY=5 (range: 1..100)

GridX and GridY (X is horizontal, Y horizontal) helps you to align object boxes into a set of equidistant positions. Value 5 opens locations on every 5th screen pixel. The parameter can also be modified via the menu File, Configure.

FixedObjBoxWidth=0 (range: 0..1)

Value 0 (=false) indicates that the width of object boxes automatically adjusts to the size of text strings inside the object box. Value 1 (=true) makes all boxes equal, but it is a risk that your text will not fit. The parameter can also be modified via the menu File, Configure.

TemplateObj=path

TemplateAttr=path

TemplateServ=path

TemplateConn=path

If you specify a path, the corresponding file will be read into template used for *Description* of objects, attributes, services and connectors. The path parameters give location of an ASCII text file. containing max 255 bytes text (may include newlines).

(1) You should specify a complete path <drive>:\dir\dir\..... or give path relatively the **Home** parameter. Max path length is 80 characters.

(2) By specifying the path **\dev\nul** you will get an empty template!

(3) If the path is not specified, or the whole parameter line is missing in WIN.INI, a default template (hard coded) is used. These path names can only be specified by editing WIN.INI.

ColorObjBox=R000,G000,B255

ColorObjInstance=R255,G000,B000

ColorConnGenSpec=R050,G150,B050

ColorConnWholePart=R050,G055,B150

ColorConnInstance=R000,G000,B000

ColorConnMessage=R150,G150,B150

Colours for graphic objects can be set by their Red/Green/Blue ratios. Prefix every colour component by 'R' 'G' and 'B'. Allowed values are 0...255. Black is generated by the combination R000,G000,B000, white as R255,G255,B255, Red as R255,G000,B000 etc.

20 File Format

(This chapter is quite long. Print it if you want.)

You may also read in the file created by File Save/Save As into any editor, and extract the desired DESC statements.

Format:

Objects (sorted in ascending *name* order). After an object there may be optional attributes, also sorted in name order. After attributes services, then the next object etc. Finally all the connectors. Note that objects, attributes, services, connectors are followed by descriptions (DESC 0 means an empty description, '+' starts every description line. A description line terminates when the user entered CTRL-ENTER or when all description text ends.

```
TITL titleString
OBJ: otype x y name
DESC len
+ text....
+ text....
<cr-nl>
SERV name
DESC len
+ ....
<cr-nl>
ATTR name
DESC len
+ ....
<cr-nl>
OBJ: otype x y name
DESC len
+ text....
+ text....
<cr-nl>
...
...
OBJI otype x y filename name
...
...
CONN ctype from to
DESC len
+ text ...
+ text ...
<cr-nl>
CONN ctype from to multipl1 multipl2
DESC len
+ text ...
+ text ...
<cr-nl>
...
...
```

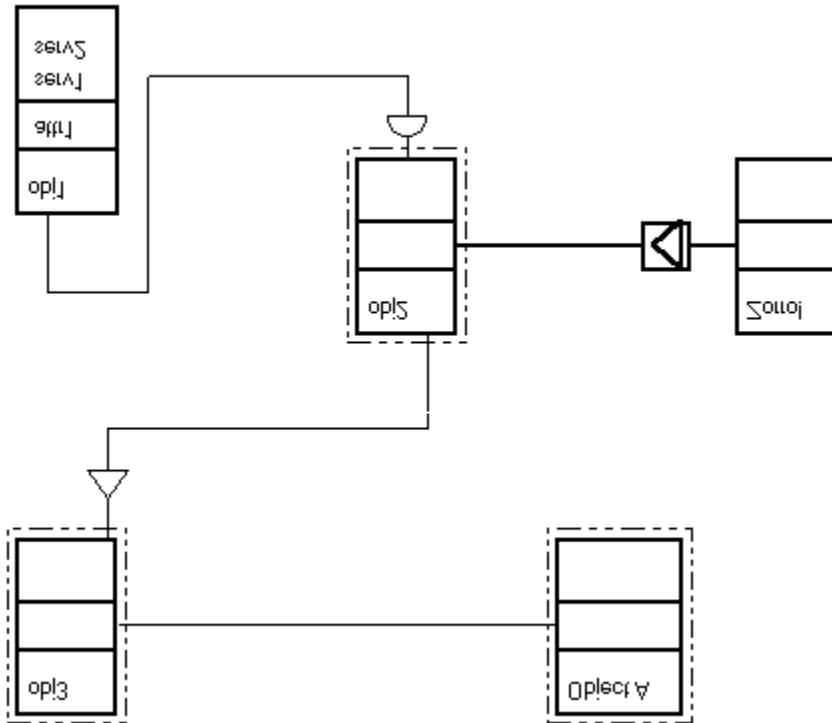
where

titleStrin arbitrary ascii string terminated by a newline

otype 0 (class-&-object) 1 (class)
x pixel coordinate for left edge of the object (0 is leftmost position)
y pixel coordinate for the top edge of the object (0 is top position)
name name of the object/attribute/service (ends with newline)
filename name of file containing imported object
len length of the description text (used to allocate memory by the tool)
 should not exceed 1500 bytes.
ctype connector type, g (gen-spec), w (whole-part) i (instance) m (message)
from number of the from-object (0,...) in the file (note: sorted!). The from
 object is always whole, generic, or the object what was selected when
 assigning association.
to number of the to-object (part, specific,...)
multipl1,multipl2 multiplicity for whole-part and instance associations. The first
 for the 'from' object the second for the 'to' object
 (0=not used, 1="0,m", 2="1,m", 3="1", 4="m")

Example: (graphics and the resulting file contents):

A nice chart!



```

TITL A nice chart!
OBJ: 0 330 20 Object A
DESC 0

OBJ: 1 420 210 Zorro!
DESC 0

OBJ: 1 60 270 obj1
DESC 61
  
```

+description of object 1, ends with <newline>
+after <newline>

ATTR attr1
DESC 20
+description of attr1

SERV serv1
DESC 16
+<no description>

SERV serv2
DESC 26
+some description for serv2

OBJ: 0 230 210 obj2
DESC 6
+Hello!

OBJ: 0 60 20 obj3
DESC 0

CONN m 1 3 0 0
DESC 17
+message transfer!

CONN g 3 2 0 0
DESC 16
+<no description>

CONN w 4 3 0 0
DESC 16
+<no description>

CONN i 0 4 0 0
DESC 20
+instance to instance