

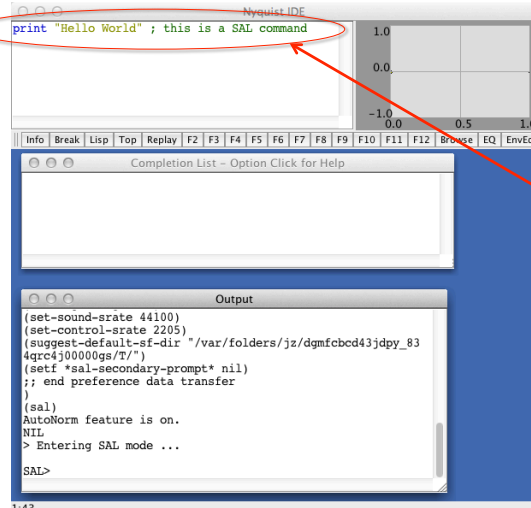
USING SAL, DEFINING FUNCTIONS

More on Nyquist and SAL

Using the SAL Interpreter

- We'll do a lot of work on-line, but you need learn how to use Nyquist and SAL on your local machine.
- Nyquist installation and startup:
<http://www.cs.cmu.edu/~music/nyquist/>
- Now, we'll cover:
 - Evaluating a SAL command
 - Finding the result of a SAL command evaluation
 - Creating a SAL program file
 - Loading (executing) the SAL program file
 - Saving your work

Evaluating a SAL Command



Nyquist window

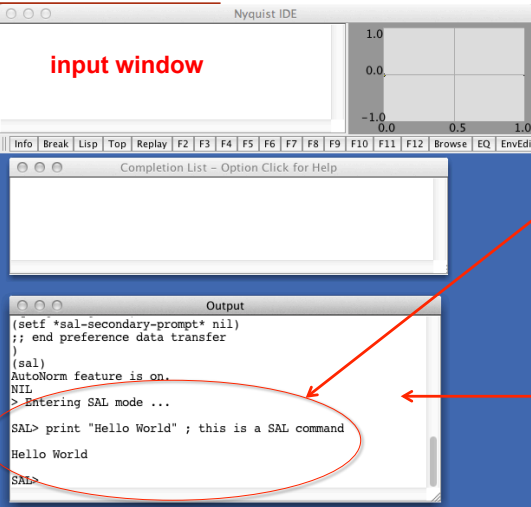
Type the SAL command here and type the return key

```
(set-sound-rate 44100)
(set-control-rate 2205)
(suggest-default-sf-dir "/var/folders/jz/dgmfcbed43dpy_83
4grc4j0000gs/T/")
(setf *sal-secondary-prompt* nil)
;; end preference data transfer
)
(sal)
AutoNorm feature is on.
NIL
> Entering SAL mode ...
SAL>
```

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Finding the Result of a SAL Command



input window

Nyquist window

Command and result appear here.

output window

```
(setf *sal-secondary-prompt* nil)
;; end preference data transfer
)
(sal)
AutoNorm feature is on.
NIL
> Entering SAL mode ...
SAL> print "Hello World" ; this is a SAL command
Hello World
SAL>
```

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Creating a SAL Program File

Click on New File button...

... to create SAL Program File window

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Creating a SAL Program File (2)

Click on Save File button...

... enter name with .sal extension ...

... and click Save button.

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Loading (Executing) the SAL File

The screenshot shows a software interface with a 'File' menu open. The 'Load' option is highlighted. The 'Output' window shows the following text:

```
> Entering SAL mode
SAL> print "Hello World"
s is a SAL command
Hello World
SAL> exec setdir("/Us
mp/icm/")
SAL>
```

Red arrows point from the 'Load' menu item to the text '... select Load...' and from the 'print "Hello World"' command to the text '... results appear in Output Window'. Other red arrows point to the 'File' menu and the 'Load' option with labels 'Edit the file...' and '... select File ...'.

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Saving Your Work

- The Load menu item
 - Saves your file
 - Instructs Nyquist to load your file
 - Nyquist then evaluates each command in the file
- thus, file saving is automatic!
- There is also a File:Save menu item
- ... and a File:Save As... menu item

Defining Functions in SAL

```
define function my-function(p, q)
  begin
    print "the value of p is", p
    display "furthermore", q
    return p + 12
  end
```

Concept checklist:

- define function
- What does `begin-end` do?
- What does `print` do?
- What does `display` do?
- Why is 72 printed?

Call it:

```
SAL> print my-function(c4, "middle-C")
```

```
the value of p is 60
furthermore : Q = middle-C
72
```

Keyword Parameters

- Keyword parameters are *optional* parameters that are matched by keyword rather than by position

```
define function kwdemo(p, scale: 1, vibrato: nil)
  begin
    with s = pluck(p) * scale
    if vibrato then
      set s = s * (1 + lfo(6) * 0.1)
    return s
  end
```

```
play kwdemo(c4) ; uses default keyword parameter
                ; values
```

```
play kwdemo(ef4, vibrato: #t) ; turn on vibrato
```

```
play kwdemo(fs5, vibrato: #t, scale: 0.4) ; order
                ; doesn't matter
```

Begin and With

```
begin
  with local-variable = 4,
    another-local ; default init to nil
  command1
  command2 ; any number of commands here
end
```

- Use **begin-end** any place you can use a statement
 - function body
 - multiple actions after **then**
- **with** introduces local variables
 - Initialization is optional
 - Default initial value is `nil` (means both “false” and “empty list”)