

Operand stack manipulation operators

```
any pop -
any1 any2 exch any2 any1
any dup any any
any1 .. any_n n copy any1 .. any_n any1 .. any_n
any_n .. any0 n index any_n .. any0 any_n
any_{n-1} .. any_0 n j roll any_{(j-1) mod n} .. any_0 any_{n-1} .. any_j mod n
# any1 .. any_n
# any1 .. any_n count # any1 .. any_n
- mark mark
mark any1 .. any_n cleartomark -
mark obj1 .. obj_n counttomark mark obj1 .. obj_n n
```

Arithmetic and math operators

```
num1 num2 add num3
num1 num2 div num3
int1 int2 idiv int3
int1 int2 mod remainder
num1 num2 mul num3
num1 num2 sub num3
num1 abs num2
num1 neg num2
num1 ceiling num2
num1 floor num2
num1 round num2
num1 truncate num2
num1 sqrt num2
num den atan angle
angle cos real
angle sin real
base exponent exp real
num ln real
num log real
- rand int
int srand -
- rrand int
```

Array operators

```
int array arry
- [ mark
mark obj0 .. obj_{n-1} ] array
array length int
array index get any
array index any put -
array index count getinterval subarry
arry1 index arry2 putinterval -
array aaload array0 .. array_{n-1} array
any0 .. any_{n-1} array astore arry
array1 array2 copy subarray2
array proc forall -
```

Dictionary operators

```
int dict dict
dict length int
dict maxlen length int
dict begin -
- end -
key value def -
key load value
key value store -
dict key get any
dict key any put -
dict key known bool
key where If found: dict true
If not found: false
dict1 dict2 copy dict2
dict proc forall -
- errordict dict
- systemdict dict
- userdict dict
- currentdict dict
- countdictstack int
array dictstack subarray
```

String operators

```
int string string
string length int
string index int
string index count
string1 index string2 putinterval -
string1 string2 copy substring2
string proc forall -
string seek anchorsearch If found: post match true
If not found: string false
string seek search If found: post match pre true
If not found: string false
string token If found: post any true
If not found: false
```

Relational, boolean, and bitwise operators

```
any1 any2 eq bool
any1 any2 ne bool
num1|string1 num2|string2 ge bool
num1|string1 num2|string2 gt bool
num1|string1 num2|string2 le bool
num1|string1 num2|string2 lt bool
bool1|int1 bool2|int2 and bool3|int3
bool1|int1 not bool2|int2
bool1|int1 bool2|int2 or bool3|int3
bool1|int1 bool2|int2 xor bool3|int3
- true true
- false false
int1 shift bitshift int2
```

Control operators

```
any exec -
bool proc if -
bool proc1 proc2 ifelse -
init incr limit proc for -
count proc repeat -
proc loop -
- exit -
- stop -
any stopped bool
- countexecstack int
array execstack subarray
- quit -
- start -
```

Type, attribute, and conversion operators

```
any type name
any cvlit any
any cvx any
any xcheck bool
array|file|string executeonly array|file|string
array|dict|file|string noaccess array|dict|file|string
array|dict|file|string readonly array|dict|file|string
array|dict|file|string rcheck bool
array|dict|file|string wcheck bool
num cvi int
string cvn name
num|string cvr real
any string cvs substring
num radix string cvrs substring
```

File operators

```
string1 string2 file file
file closefile -
file read If end-of-file: byte true
If not end-of-file: false
file int write -
file string readhexstring substring bool
file string writehexstring -
file string readstring substring bool
file string writestring -
```

```

file string readline substring bool
file token If found: any true
      If not found: false
file bytesavailable int
  - flush -
file flushfile -
file resetfile -
file status bool
string run -
  - currentfile file
string print -
  any = -
# any1 .. anyn stack # any1 .. anyn
  any == -
# any1 anyn pstack # any1 anyn
  - prompt -
bool echo -

```

Virtual memory operators

- **save** save
- save **restore** -
- **vmstatus** level used maximum

Miscellaneous operators

```

proc bind proc
  - null null
  - usertime int
  - version string

```

Graphics state operators

- **gsave** -
- **grestore** -
- **grestoreall** -
- **initgraphics** -
- num **setlinewidth** -
 - **currentlinewidth** num
- int **setlinecap** -
 - **currentlinecap** int
- int **setlinejoin** -
 - **currentlinejoin** int
- num **setmiterlimit** -
 - **currentmiterlimit** num
- array offset **setdash** -
 - **currentdash** array offset
- num **setflat** -
 - **currentflat** num
- num **setgray** -
 - **currentgray** num
- hue satur bright **sethsbcolor** -
 - **currenthsbcolor** hue satur bright
- red green blue **setrgbcolor** -
 - **currentrgbcolor** red green blue

frequency rotation proc **setscreen** -
 - **currentscreen** frequency rotation proc

proc **settransfer** -
 - **currenttransfer** proc

Coordinate system and matrix operators

- **matrix** matrix
- **initmatrix** -
- matrix **identmatrix** matrix
- matrix **defaultmatrix** matrix
- matrix **currentmatrix** matrix
- matrix **setmatrix** -
 $t_x \ t_y$ **translate** -
 $s_x \ s_y$ **scale** -
 angle **rotate** -
 angle matrix **rotate** matrix
- matrix **concat** -
 matrix1 matrix2 matrix3 **concatmatrix** matrix3
 $x \ y$ **transform** $x' \ y'$
 $x \ y$ matrix **transform** $x' \ y'$

xd yd	dtransform	xd' yd'
xd yd matrix	dtransform	xd' yd'
x' y'	itransform	x y
x' y' matrix	itransform	x y
xd' yd'	idtransform	xd yd
xd' yd' matrix	idtransform	xd yd
matrix1 matrix2	invertmatrix	matrix2

Path construction operators

- **newpath** -
- **currentpoint** x y
- x y **moveto** -
- dx dy **rmoveto** -
- x y **lineto** -
- dx dy **rlineto** -
- x y r ang1 ang2 **arc** -
- x y r ang1 ang2 **arcn** -
- x1 y1 x2 y2 r **arcto** xt1 yt1 xt2 yt2
- x1 y1 x2 y2 x3 y3 **curveto** -
- dx1 dy1 dx2 dy2 dx3 dy3 **rcurveto** -
- **closepath** -
- **flattenpath** -
- **reversepath** -
- **strokepath** -
- string bool **charpath** -
- **clippath** -
- **pathbbox** llx lly urx ury
- move line curve close **pathforall** -
- **initclip** -
- **clip** -
- **eoclip** -

Painting operators

width height bits/sample	image	matrix proc
width height invert	imagemask	matrix proc

Device setup and output operators

matrix width height	showpage	proc
matrix width height	copypage	proc
matrix width height	banddevice	proc
matrix width height	framedevice	proc
-	nulldevice	proc
-	renderbands	proc

Character and font operators

key font	definefont	font
key	findfont	font
font num	scalefont	font'
font matrix	makefont	font'
font	setfont	-
string	currentfont	font
string	show	-
ax ay string	ashow	-
c _x c _y char	widthshow	-
c _x c _y char	awidthshow	-
ax ay string	kshow	-
proc string	stringwidth	w _x w _y
string	FontDirectory	dict
-	StandardEncoding	array

Font cache operators

w _x w _y llx lly urx ury	cachestatus	bsz bmx msz mmx csz cmx maxbits
w _x w _y	setcachedevice	-
w _x w _y	setcharwidth	-
num	setcachelimit	-

