

Welcome

Writing a simple graphics app on RISC OS

Chris Dewhurst, Drag N Drop

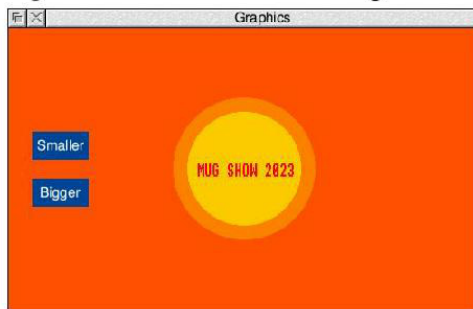
WWW.DRAGDROP.CO.UK



We are going to write a simple application.

It will plot a sun in a window on the desktop

It will let you click icons to change the sun's size.



WWW.DRAGDROP.CO.UK



RISC OS Present

BBC Basic is over 40 years old.

Some people think it's only for
beginners learning to code.



But you can also write very sophisticated apps
using BBC Basic 5 on RISC OS Raspberry Pi.

If you know a little BBC Basic you'll have
no problem following the discussion.

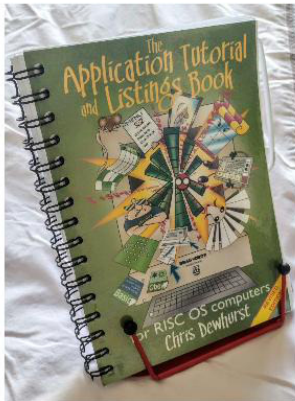
WWW.DRAGDROP.CO.UK



The Application Tutorial and Listings Book

Revised 2023 edition!

The material in this presentation is based on the (paper) book available from www.dragdrop.co.uk



WWW.DRAGDROP.CO.UK

Special MUG show price

£15.00

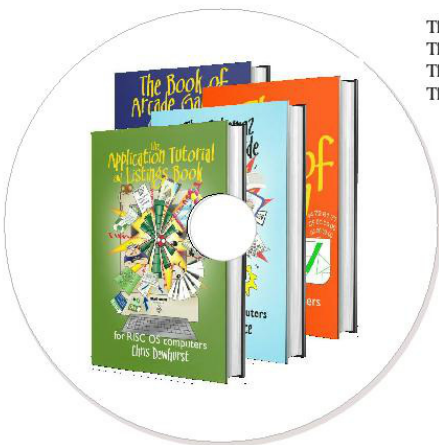
this weekend only!

or find in our eBay shop
dragdropcuk



Release date 28th July 2023

4 RISC OS Books on one CD-Rom



The Application Tutorial and Listings Book
The Schema2 Tutorial Guide
The Book of Arcade Games
The Book of Draw Stuff



PDF, HTML, EasiWriter/Impression
Plus all the type-in programs

**Introductory Price
£20.00**

WWW.DRAGDROP.CO.UK



Getting Started

Firstly install Edit on the iconbar.

Menu over Edit's icon and choose Create>Basic

Next, we some 'standard' procedures

Type them from the next slide or you can
download them (plus all of today's materials) from

www.dragdrop.co.uk/free.htm

WWW.DRAGDROP.CO.UK



```

DEF FNMKWINDOW
READ $T,X,Y,W,H
FOR I=0 TO 84 STEP 4
READ A$
I!B=EVALA$
NEXT
T+= LEN $T+1
SYS "Wimp_CreateWindow",,B TO X
=X

DEF PROCREDRAW
SYS "Wimp_RedrawWindow",,B TO I
X0=B!4 - B!20:Y0=B!16 - B!24
WHILE I
PROCPLT
SYS "Wimp_GetRectangle",,B TO I
ENDWHILE
ENDPROC

DEF PROCMKICON(H,X,Y,W,D,F,A$,U)
$T=A$ : RESTORE +1
DATA H,X,Y,X+W,Y+D,F, T,U,LEN A$+1
FOR I=0 TO 32 STEP 4
READ B$ : I!B = EVAL B$
NEXT : T+= LEN A$+1
SYS "Wimp_CreateIcon",,B TO I
ENDPROC

DEF PROCOPEN(W)
!B=W: SYS "Wimp_GetWindowState",,B
SYS "Wimp_OpenWindow",,B
ENDPROC

DEF PROCPLT
ENDPROC

```

Don't worry about exactly how these procedures work. You can type the five procedures in any order. We will fill in PROCPLT later.

WWW.DRAGDROP.CO.UK



Now start typing some code
The first line is very important

```
ON ERROR SYS "Wimp_CloseDown":REPORT:PRINT " at line ";ERL/10:END
```

If anything goes wrong, the app is stopped error and line number reported.



The line number is divided by 10 so that in Edit you can press f5, type in the number and go to the problem line.

WWW.DRAGDROP.CO.UK



Next some variables.

```

DIM B 500: REM for window manager operations.
DIM T 500: REM for window and icon text.
radius=150

```

'B' is an area of memory for RISC OS to put information in about mouse clicks, menus and other things we might need to know.

'T' is where window title and icon text is stored.

(We'll come to 'radius' later.)

Now we tell RISC OS to register our app

```
SYS "Wimp_Initialise",200,&4B534154,"Graphics"
```

Don't worry about the 'magic numbers' 200 and &4B534154.

WWW.DRAGDROP.CO.UK



Now we'll set up a window.

```
DATA "Graphics": REM title
DATA 300,350,1000,600:REM bottom left plus width and height
DATA X,Y,X+W,Y+H,0,0,-1 : REM always
DATA &00000003:REM window flags
DATA &00000107,&00000000:REM window colours
DATA 0,0,W,H
DATA &00000109 : REM title flags
DATA 0,0,0,1,0,0,0 : REM always
W1=FNMKWINDOW
```

We have a window at (300,350) on the desktop
1000 x 600 units big entitled "Graphics".
It's given a 'handle' called 'W1'.

What do those & numbers do ??
The '3' in the window flags is worked out by adding 1 + 2,
1= title bar + 2=we want to draw graphics on our window
The '9' in the last digit of the title flags means a centred window title
The other '1' must always be there. Other digits control other aspects.



WWW.DRAGDROP.CO.UK

We have set the window up but need to open it
A call to PROCOPENWINDOW is all we need.

PROCOPEN(W1)

These lines are needed to get RISC OS used to
drawing our graphics before it does the icons.

```
PROCREDRAW
PROCPLLOT
PROCREDRAW
```

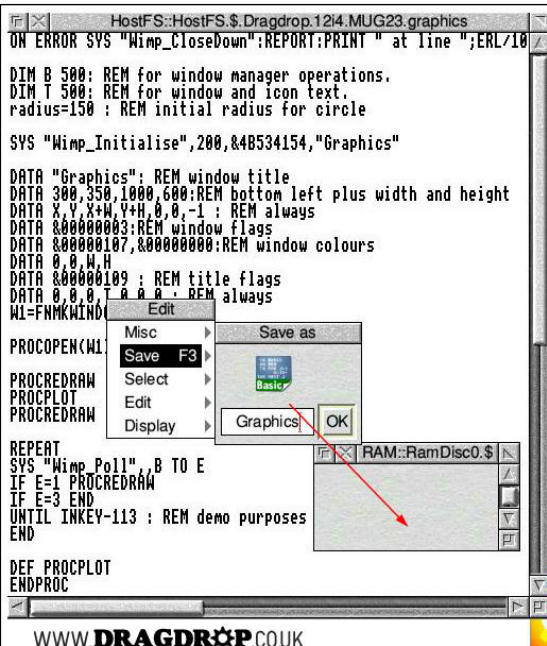
Now we come to the main loop. It asks RISC OS
what 'events' are affecting our app.

```
REPEAT
SYS "Wimp_Poll",B TO E
IF E=1 PROCREDRAW
IF E=3 END
UNTIL INKEY-113
END
```

Get the event number in variable E
Event number 1 tells us it's time to redraw!
Event number 3 is when you've clicked on the close icon so we just END the app.
Or (for demo purposes) press Escape to stop.



WWW.DRAGDROP.CO.UK



Save your
code as
'Graphics'.



If you double click 'Graphics' you'll get a rather boring blank window but you've checked your program is working.



We'll now add some colour. Press Escape or click on the close icon.

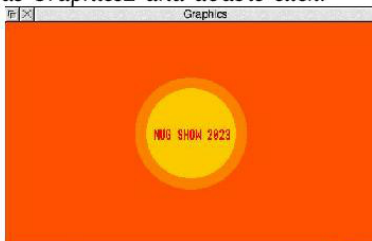


WWW.DRAGDROP.CO.UK

Amend the PROCPLLOT procedure as follows:

```
DEF PROCPLLOT
GCOL 255,80,0 :REM GCOL r,g,b
RECTANGLE FILL XO,YO,1000,600
GCOL 255,128,0
CIRCLE FILL XO+500,YO+300,radius
GCOL 255,200,0
CIRCLE FILL XO+500,YO+300,radius-30
GCOL 255,0,0
MOVE XO+400,YO+310:PRINT "MUG SHOW 2023"
ENDPROC
```

XO and YO are the co-ordinates of the bottom-left corner of the window. Note GCOL r,g,b in BBC Basic eg GCOL255,128,0 orange
Save your code as Graphics2 and double click!



WWW.DRAGDROP.CO.UK

We'll now add some icons



By 'icon' we mean a button with text on it
Icons are just rectangular areas so can be buttons, pictures and/or text.

```
PROC MKICON(W1,550,320,120,60,&80004121,"Smaller",1)
PROC MKICON(W1,550,220,120,60,&80004121,"Bigger",1)
```

add these two lines after W1=FNMKWINDOW

PROC MKICON takes 8 parameters:

W1 is the window handle we got earlier with FNMKWINDOW

50,220 are the coordinates relative to the window bottom left

120 is the icon width, 60 the icon height

&80004121 is the icon flags (see next slide)

Then the icon text plus validation (just '1' for now)

Icons are numbered in order of creation, starting at 0.

So icon 0 is 'Smaller' icon 1 is 'Bigger'



WWW.DRAGDROP.CO.UK

Icon flags What do all those numbers mean?

&80004121



working from RIGHT to left:

'1' means the icon has text in it.

'2' means the icon has a filled background

'1' must always be there

'4' is the button type, type 4 means tell our app when clicked

The 6th & 7th digits are unused

'0' is the foreground colour from a predefined palette (0=white)

'8' is the background colour - dark blue

(effective only if the 2nd digit is '2')

WWW.DRAGDROP.CO.UK



Mouse Clicks

So we have a couple of icons which can be clicked
How do we know when they are clicked?

Update the loop to deal with
event no. 6, mouse click...

```
REPEAT
SYS "Wimp_Poll",,B TO E
IF E=1 PROCREDRAW
IF E=3 END
IF E=6 PROCCLICK
UNTIL INKEY=113 : REM demo purposes
END
```

after the loop code
add the PROCCLICK definition:

```
DEF PROCCLICK
IH = B!16: REM icon number (handle)
IF IH=0 AND radius>0 radius+=2
IF IH=1 AND radius<300 radius+=2
B=W1:SYS "Wimp_GetWindowState",,B
PROCREDRAW
ENDPROC
```



Icon Handle (IH) of icon clicked
obtained with IH=B!16

Last two lines update RISC OS

Save your updated program as Graphics3

WWW.DRAGDROP.CO.UK

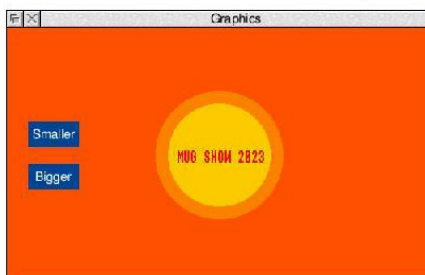


Improvements

The app works fine but

1. Can we drag the window?

2. Can we make the icons more 'button like'?
(flash briefly)



1. Yes! Just add
IF E=2 SYS "Wimp_OpenWindow",,B
to the loop

2. Yes! See next slide...

WWW.DRAGDROP.CO.UK



Can we make the icons more 'button like'?

By use of validation strings. They control extra icon characteristics.

Add the following after the line reading 'radius=150'

```
DIM V 20: REM validation strings
$V="R6,14"
```

Reserves memory V. "R6" is the magic code for "temporarily flash the icon to the colour after the comma" - colour code 14 (orange) from the predefined palette.

```
PROC MKICON(W1,550,320,120,60,880004129,"Smaller",V)
PROC MKICON(W1,550,220,120,60,880004129,"Bigger",V)
```

Amend the PROC MKICON lines as above

The last parameter is now 'V' not '1'.

Also the last digit of the flags is 9, I have added 8 for centralised text.

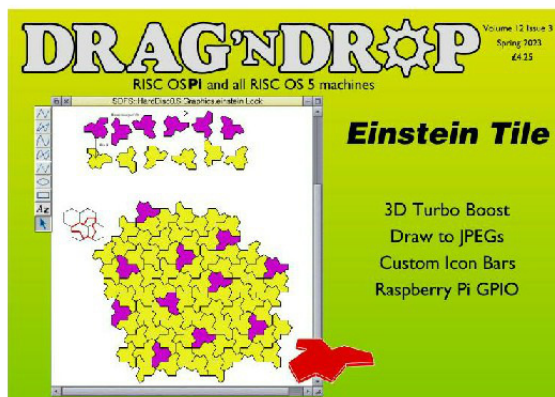
Save your code as Graphics4

WWW.DRAGDROP.CO.UK



Drag 'N Drop magazine

We always feature type-in apps so read Drag 'N Drop to learn more.



Next issue due out July 28th 2023

WWW.DRAGDROP.CO.UK

