ARMBOOK

WIMPs
TSV2Draw   RoundBox

Reviews
Star Mine

Tutorials
Schema2   3D Graphics

Wakefield

Acorn & RISC OS Computer Show

Saturday 18th April 2020

25 Years

RISC OS AWARDS

Best show or event 2017 and 2018

The North's premier RISC OS show since 1996

RISC OS Awards' best show or event in 2017 & 2018

The Cedar Court Hotel
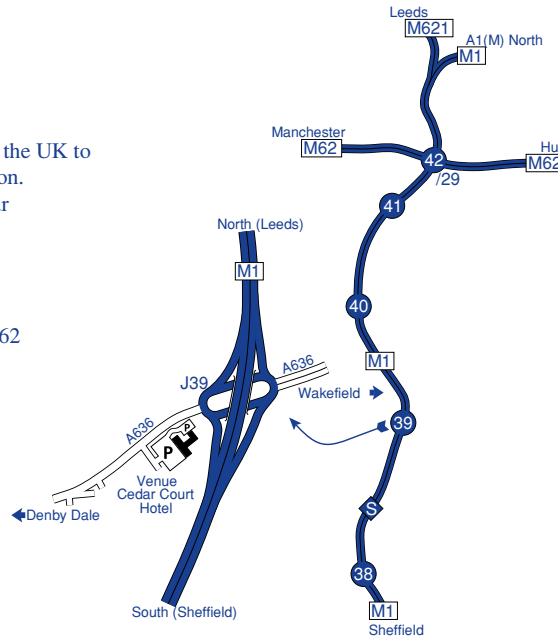**Denby Dale Road, Calder Grove, Wakefield**
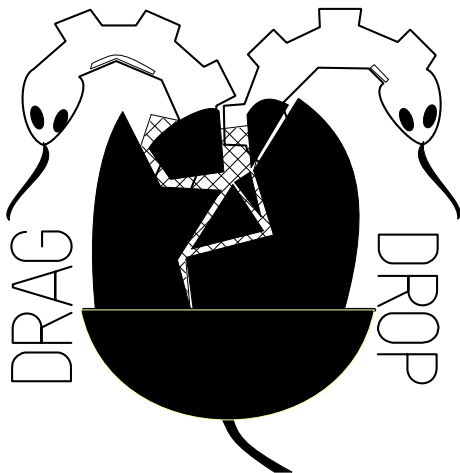**West Yorkshire WF4 3QZ**

(Adjacent to J39 of the M1)

- Big Names and Small Developers
- Raspberry Pi
- Show Theatre
- On-site Catering
- Prize Draw
- Charity Stall
  raising funds for Wakefield Hospice

Getting there by train
- Connections from across the UK to Wakefield Westgate station.
- Local buses twice an hour to the venue

Getting there by car
- Easy access from M1, M62 and major routes
- Free on-site parking

Leeds M621 • A1(M) North • M1 • Manchester M62 • 42/29 • Hull M62 • 41 • North (Leeds) M1 • 40 • M1 • J39 • A636 Wakefield • 39 • A636 • Venue Cedar Court Hotel • ◀ Denby Dale • S • 38 • M1 Sheffield • South (Sheffield)

- Date   Saturday, 18th April 2020
- Opening time   10.30am to 4.30pm
- Ticket price   £2 on the door
                Entry for children aged 12 or under (accompanied by an adult) is FREE
- Access   Disabled access to the show venue is via a lift

- Enquiries   Wakefield Show 2020, c/o 3 Riverdale Avenue, Stan Wakefield, WF3 4LF
- Email   show2020@wakefieldshow.or

Show organised by

Wakefield RISC-OS Computer Club
Formed 1983

For further information, visit

www.wakefieldshow.org.uk

EDITORIAL

Welcome to the Winter 2020 edition of *Drag 'N Drop*. I am typing this editorial, waiting for a train in Scotland, on one of the new ArmBooks from R-Comp. The magazine is now set using Impression Style. Mainly because Style is available and to support the development work on Impression-X. Also because Easiwriter hasn't been updated for about 7 years.

I hadn't used the Impression family of products for at least a decade but it took less than a week for me to remember everything, showing how intuitive RISC OS is.

By the time you read this the South West show will be underway. Even if you can't come to Bristol in person, do please support the RISC OS developers and publishers. It's amazing – and heartening – to see how the platform is developing.

In the following pages you'll find the usual eclectic mix of news, revews, tutorials and listings to type in, with a focus on apps (a double helping in this issue!)

Chris.

CONTENTS
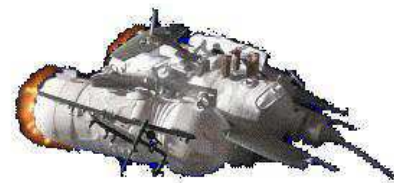
Beginner's Page

✿✿ How do I get the BBC Basic prompt?

Press F12 and type *BASIC and press Return. You can change the screen mode with MODE n where n is a number e.g. MODE 7 or MODE 0.

Type AUTO for automatic line numbering. Press Escape to stop and type SAVE "myprog" followed by Return to store myprog on hard disc.

To return to the desktop type *QUIT.

Programs listed in Drag 'N Drop are assumed to work on all machines with RISC OS 5 e.g. Raspberry Pi, unless otherwise stated.

✿✿ How do I open a Task window?

Menu click over the Raspberry icon on the right side of the iconbar and select click on Task window. Or press Ctrl + F12.

Next	1440K	

You may need to reserve more memory for the task in which case adjust-click on the Raspberry icon and under Application tasks click and drag the Next slide bar out to the right.

You can also type programs in a task window, hold down Ctrl and press F12. You can't use the cursor editing facility or change MODE, however.

```
Task window
*BASIC
ARM BBC BASIC V
version 1.54
Starting with 651516
bytes free
>
```
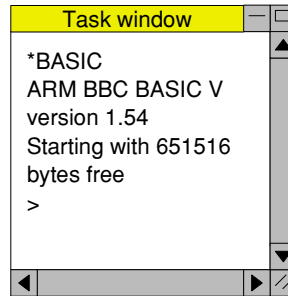
You can also program and run Basic programs from the desktop. Double-clicking on the filer icon runs it, holding down Shift and double clicking loads it into your text editor.

✿✿ What does 'currently selected directory' mean?

Articles may tell you to set the CSD (currently selected directory). Just click menu over filer window and choose Set directory ^W. It's where the computer stores the file when you type SAVE "myprog".

✿✿ How do I open an Applcation Directory?

Application directories begin with a ! called 'pling'. Hold down the shift key and double click select to open the directory.

✿✿ I get a blank screen when running games listings

Check you have the Anymode module installed. You can download it from www.pi-star.co.uk/anymode. It goes in !Boot.Choices.Boot. Predesk.

Open the !Boot application directory, in the root directory of the SD Card, that is SDFS::RISCOSPi. $.!Boot. Locate the Loader which is a multi-coloured directory with PC written on it. With Shift held down double click it to open it. Create a text file in Edit with the following line (press Return at the end):

```
disable_mode_changes
```

Save it inside Loader as CMDLINE/ TXT and restart your machine.

✿✿ Sounds are strange

Some listings need the RDSP module installed. Download it from www.amcog-games.co.uk/rdsp.htm where you'll find instructions on how to install it.

News and App Updates

South West Show

The RISC OS exhibition takes place at the Arnos Manor Hotel in Bristol on 22nd February 2020. This the second year at its new venue which is easily accessible by car and train and still costs only £5 on the door to get in. See you there! www.riscos-swshow.co.uk/

Wakefield Show

If you're not able to make it to the west country then 18th April marks the 25th Yorkshire show at the Cedar Court Hotel in Wakefield. To celebrate the quarter century, admission price is just £2 on the door. More details at wakefieldshow.org.uk/

Impression Newsletter

Users of the iconic desktop publishing package should read the second newsletter at www.svrsig.org/News2.pdf. It focuses on the paid-for Impression-X (being developed by Richard Keefe) but much is relevant to the free Impression-Style that RISC OS Developments took over in 2019.

Read all about planned Word import, support for image formats other than Sprite/JPG and a new user guide. (The first newsletter is included in the download zip of Style from !Store.)
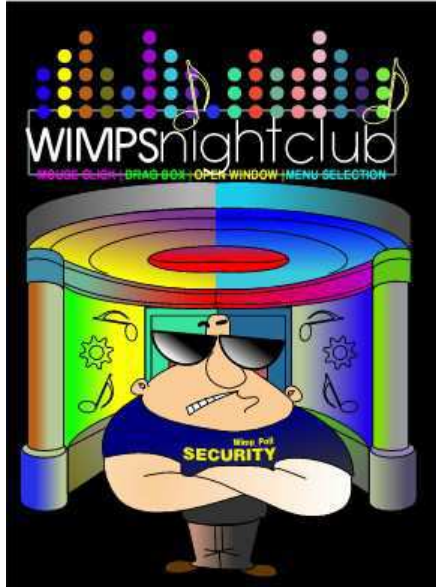
Drag 'N Drop Publication

A new book The App Tutorial And Cookbook on writing your own desktop applications will be out in 2020. Traditionally an arcane and difficult subject to master, this book on RISC OS Wimp programming will be presented in the usual Drag 'N Drop accessible style and will feature type-in applications from the pages of the magazine.

ClassicRip 1.09

This has been available as a single-tasking but has been given a Wimp front-end to make transfer of tracks from CD medium to digital format more convenient. See www.audiomisc.co.uk/software/index.html.

RiscOSM 1.73

The vector map rendering app using OSM (Open Street Map) data has had various cosmetic enhancements and now includes data on planning applications and road traffic accidents. The upgrade is free to current users from www.sinenomine.co.uk/software/. A new copy of RiscOSM costs £18 by download, £25 on CD or SD card.

Recce 1.03

Companion to RiscOSM, Recce allows you to look at Google street view photos of locations on a RiscOSM map. Version 1.03 costs

£10 and sale proceeds go directly to the ROOL bounty for TCP/IP stack improvements. www.sinenomine.co.uk/software/.

Prophet 4.05

Prophet is a business accounts package for RISC OS and has received behind-the-scenes bug fixes and updates which are free to current users. New copies of the software cost £95 with the Making Tax Digital module an extra £54. Visit shop.elesar.co.uk > Software.

AMCOG Games Collections

If you missed out on the original release of AMCOG's games then you might like to consider the two collections available through Elesar. £19.99 will buy you three complete games on an AMCOG-branded memory stick in a durable plastic case. The Puzzles collection contains Legends of Magic, Mop Tops and Escape from the Arcade whilst the The Space Collection consists of (Star Mine, Xeroid and Protector). Go to shop.elesar.co.uk > Software.

Python 3.8 on test

Python is a programming language popular on Raspberry Pi (tutorials have featured in Drag 'N Drop). The RISC OS port is now being upgraded to 3.8. See www.mediafire.com/ m0vxr49pmphzyy6/Python3.zipfile Be warned, the convoluted URL means it's only alpha quality at the moment!

KevSoft

Kevsoft who develop small (but free and very useful) apps have released updates for QrCode, MACadd, BusTimes and TrainTimes. Get along to riscos.kevsoft.co.uk to refresh your apps

ADFFS 2.72

ADFFS is an application which emulates floppy drives on legacy RISC OS machines e.g. Archimedes Visit forums.jaspp.org.uk/forum/ viewtopic.php?t=483. On Netsurf the download is 'file/php' and you need to set the filetype to Zip before opening.

DrawGen 3.01SD

You can create Drawfiles with this app from a simple programming language (which itself can be generated from conventional languages like Basic, Fortran etc.) jcgl.orpheusweb.co.uk/DrawGen/ dgen.html
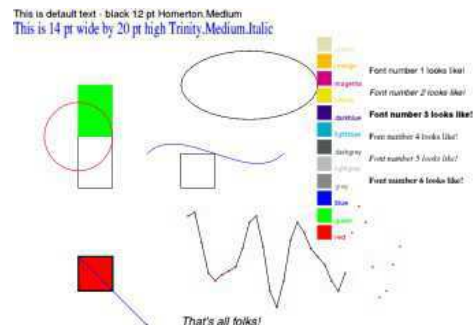
Armbook

In this article we take the first look at the powerful new RISC OS laptop supplied by R-Comp. Price is £550 upwards, depending on machine specification.

The computer is actually a Pinebook manufactured by Pine Microsystems with an ARM Cortex A53 processor at heart. It has a 10,000mAh battery, 11.6" screen, full size keyboard and trackpad. There are two USB sockets and the micro-SD slot is used for RISC OS.

There is no choice of colour, your machine is white (a nice contrast to so many laptops). It arrives in a plastic box, part of the packaging but re-usable as a travel case. You get a USB-Ethernet adaptor, a 16-page booklet 'Introducing the Armbook' and RISC OS installed on micro-SD, which doubles up as the main hard drive, typically 128GB of storage and password for online updates.

Accessories such as a powered USB hub and external solid state drive (SSD) should you need large amounts of data available to more
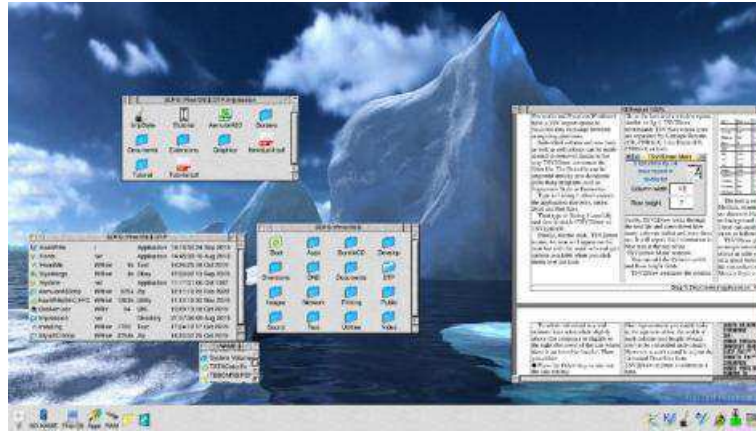
than one machine. I found the hub useful not least because the Armbook can be powered from it instead of the ridiculously short mains lead.

Pine Microsystems put Linux in as the default OS so if for accessing the websites currently problematic on RISC OS you can temporarily pop the micro-SD card and boot into Linux.

The machine is started by pressing the power button although when connected to the mains it switches itself on.

After some intialisation and display of boot-up progress (a massive 2GB Ram!) the desktop appears.

The display is an enormous 1920 × 1080 pixels but with the screen 10 inches across that's 192 pixels per inch, so not for failing eyesight!

A pine cone is now the switcher icon and wee apps like a battery monitor appear on the icon bar.

Aemulor can be downloaded for free for the Armbook so you don't need to be without your favourite software. Programs written in BBC Basic, of course like the apps in this issue of Drag N Drop will not need any modification. ∎

Product: Star Mine
Cost: £11.99
Supplier: AMCOG, www.amcog-games.co.uk

Star Mine is an action-packed 3D adventure shoot-em-up taking place in a deep-space maze.

I recall how I was enthralled with a BBC Micro game called Star Maze and seeing the screenshots from this latest offering from AMCOG games I wondered if it's based on the same idea.

It is and it's better. As with all of the high quality products from AMCOG. The title screen summarises the controls and aspects of things you will encounter in the game plus a difficulty selector (I only tried Beginner). Atmospheric music starts up and you press Return to set off.

You steer your ship through the labyrinth of 100-metre high walls, controlling thrust/ brake, altitude and rotation. It took me a while to get used to the keyboard control! Six control keys, plus a seventh to fire at oncoming nasties: enemy ships, spinners, skulls and what look like bats!

Every object is incredibly detailed and solidly animated in 3D. The top of the screen displays your

score, a scanner showing a plan view of the maze and shield power. Gems and cubes can be collected for extra points. Asteroids can also be destroyed after breaking them down into meteorites. You can bounce off the maze walls without shield penalty. Star Mine is recommended!

TSV2Draw

TSV2Draw is a type-in desktop application which takes a Tab Separated Value (TSV) text file and formats it into a Drawfile.

Most spreadsheet software (e.g. Fireworkz and Excel on Windows) have a TSV export option to facilitate data exchange between computing platforms.

Individual column and row lines as well as cell colours can be easily altered or removed thanks to the way TSV2Draw constructs the Drawfile. The Drawfile can be imported directly into document publishing programs such as Impression Style or Easiwriter.

Type in Listing 1 which creates the application directory, sprite, Boot and Run files.

Then type in listing 2 carefully and save it inside !TSV2Draw as TSV2DRAW.

Finally, double click !TSV2Draw to run. An icon will appear on the icon bar with the usual info and quit options available when you click menu over the icon.
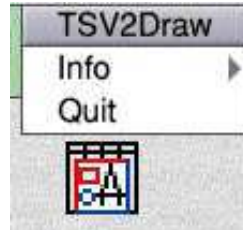
To activate TSV2Draw, drag a text file to the icon and a window opens similar to fig.1. TSV2Draw understands TSV files whose lines are separated by Carriage Returns (CR, CHR$13), Line Feeds (LF, CHR$10) or both.
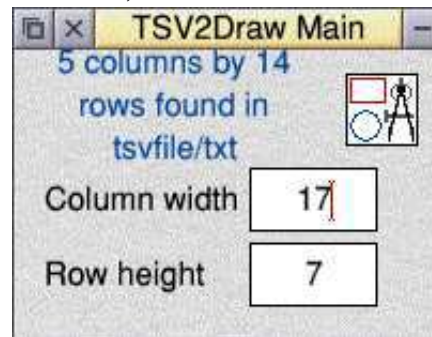
Firstly, TSV2Draw looks through the text file and notes down how many columns (tabs) and rows there are. It will report this information in blue text at the top of the 'TSV2Draw Main' window.

You can edit the Column width and Row height fields

TSV2Draw estimates the column width based on the largest number of characters it finds between tabs in the file. Clicking in the boxes and alter the numbers as needed. They are measured in millimetres.

Drag the Drawfile icon at the top right out to a filer window, desktop publishing app or even Draw itself.

Month	Max temp	Min temp	Sunshine	Rainfall
	°C	°C	hours	mm
January	6.8	1.5	48.5	157.2
Feburary	6.8	1.1	70.3	111.1
March	9	2.6	101.6	116.9
April	11.6	3.7	154.3	89.3
May	14.9	6.4	186.6	85.9
June	17.3	9.1	173.6	85.8
July	19.2	11.2	179	92.6
August	18.9	11	168	107.4
September	16.6	9.1	127.7	116.6
October	13	6.7	93	169.6
November	9.6	3.9	56.5	162
December	7.2	1.8	42	165.8

The text is set in Homerton Medium, column lines and row lines are drawn in black and there is and no background colour to the cells. These can easily be changed in Draw as follows.

TSV2Draw places an invisible rectangle around each cell. To colour in table cell(s) simply click on a space between the cell text and the row/columns lines and click Menu > Style > Fill colour.

Procedures

CELL   Insert text B$ into Drawfile. Ensure string length is a multiple of 4 bytes, pad with extra nulls if necessary. Using the DATA in line 2820 insert text object 1 and update pointer P.

CLICK   Deal with mouse clicks

FINDT   Find number of columns and rows in file F$. Set max columns and row counter to zero. Set tab counter to zero, read in byte until it's tab, CR or LF. If tab increment X. Keep reading in chars until CR/LF found. If X is greater than MX set MX to X to signal greater number of columns detected in this line. Look at next char in file, could be CR/LF for text files with double line CR+LF separators. If it's tab set X to 1. Increment MY. Proceed until end of file reached.

INIT   Set up variables, define windows and icons.

LOAD   Attempt to load in the file dragged to the iconbar icon. If filetype isn't &FFF (text) end procedure. Call PROCFINDT.

MESSAGE   Deal with Wimp messages

MENU   Decode menu selection

MKDRAW   Make Draw file. Lines 2110-2120 contain words to make up Drawfile header, which includes object type 1 (font). Line 2240 contains details for path object 2, rectangle with no line and no fill colour, which is RESTOREd to each time for every cell in the table. Next put in the row lines, each line a group (line 2360) of two lines, the row line itself (2370) and an invisible thicker 'handle' on the end (2380). Column lines built in a similar way. Next put in the text by OPENINg the input file. Read in char, long as it's not tab/CR/LF add to B$. If tab, cell empty, if not insert text into Drawfile using PROCCELL.

PROCMKICON (H,X,Y,W,D,U$,F,V)   Insert icon into window H, with bottom left at (X,Y) of length W and depth D, initial contents U$ and flags F and validation V. If V=0 assumed to be a Wimp sprite.

MKWINDOW   Make Wimp menu in memory. There is always a RESTORE+1 followed by the Window data followed by a call to MKWINDOW to ensure the correct data is read in.

RDICON(W,H)   Return contents of icon H in window W returning it as a string.

STR0CR(A)   Find null-terminated string in memory at address A and convert it to CR-terminated string by poking CHR$13 where the CHR$0 was.

WRICON(W,H,A$)   Write string A$ to icon H in window W.

Variables

B   Parameter block for Wimp SYS calls.

CW   Column width

DMM, DP   Draw units per mm and per point

M   Memory block for Draw file operations

MX   Max number of columns (tabs) found in input file.

MY   Number of rows found in input file.

N   Memory block for menu data.

P   Memory pointer, offset from M.

Q   Quit flag. Becomes TRUE when user selects menu option to exit application.
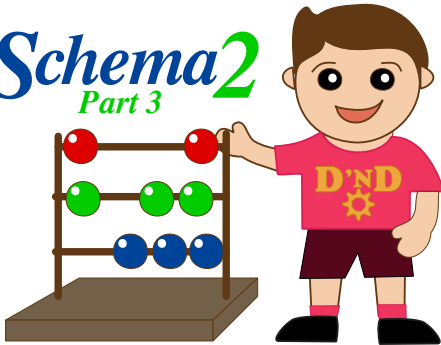
RH   Row height

T   Memory block holding window titles.

U   Memory block holding icon text.

V   Memory block holding validation strings for icons.

Schema2
Part 3

In this third article on Schema2 we'll look at the use of matrices, circular references and create a contour map from spreadsheet data.

But before we begin it is a good idea to refresh our memories on simultaneous equations and matrices. Each of the following equations contains two unknowns, x_1 and x_2.

$$2x_1 + 3x_2 = 13$$
$$5x_1 - 3x_2 = 1$$

Recalling mathematics learnt during school days, to obtain values for x_1 and x_2 in this example we need to solve the two equations simultaneously.

We also need the same number of equations as unknowns which in our case is two unknowns. In addition the equations must be independent of each other i.e. the second equation cannot simply be the first equation multiplied by a constant.

Looking at our equations it can be seen that by adding the second equation to the first the x_2 terms are cancelled and we are left with the expression

$$7x_1 = 14 \text{ and so } x_1 = 2$$

Adding the known value for x_1 into either of our two equations produces the value for x_2 as 3.

That was easy with just two equations but in engineering many situations involve the solution of more complex systems of equations, for example in structural analysis the number of unknowns can be in the tens of thousands.

Such systems of equations are beyond the capability of spreadsheets like Excel or Schema2 and need specialist programs with highly efficient solvers to obtain the solution.

However, spreadsheets are quite capable of solving a system of equations involving 20 or 30 unknowns.

Our two simultaneous equations can be expressed in compact matrix form as

$$A = \begin{matrix} 2 & 3 \\ 5 & -3 \end{matrix} \quad X = \begin{matrix} x_1 \\ x_2 \end{matrix} \quad B = \begin{matrix} 13 \\ 1 \end{matrix}$$

or even more compactly as $AX = B$.

A matrix is simply a two-dimensional array of numbers and like an array the elements of a matrix are characterised by a row number and a column number. In our example A is a 2×2 square matrix (number of rows and columns are the same) while X and B are column vectors.
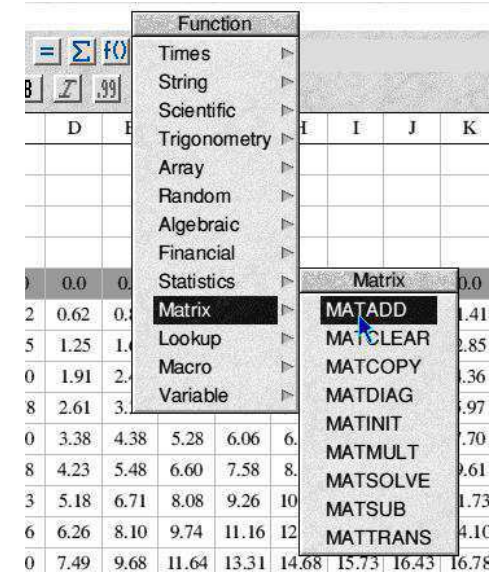

Figure 1. Schema 2 Matrix options.

RoundBox

Easy rounded corners!

Boxes with rounded corners are all the rage in graphic design at the moment.

But there isn't an easy way of producing them on RISC OS (unless you own an expensive graphics package like Artworks).

Until now, that is. RoundBox is a type-in desktop application which allows you to make curved boxes in Draw format, of any size and width. Not only that you can control the roundedness of the corners for different effects. All within an easy-to-use Wimp interface.

Firstly type in Listing 1 which creates the application directory, sprite, Boot and Run files.

Then type in listing 2 carefully and save it inside !RoundBox as ROUNDBOX.

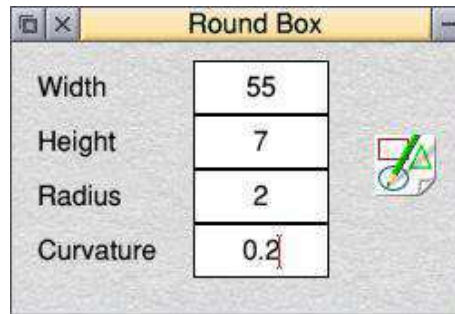Double click on !RoundBox. A window appears on the desktop, similar to Figure 1.

Figure 1. RoundBox main window

The width and height are the dimensions of the box in millimetres. The Radius is the radius in millimetres of an invisible circle at the corners of the box. Try larger values for oval-looking boxes.

The curvature controls the extremity of the roundedness. 0.3 seems to produce the best result and you can type in expressions as well as numbers, such as 1/3. Interesting effects can obtained with negative or large values (see figure 2).

C=1.5 R=10
C=1.5 R=5
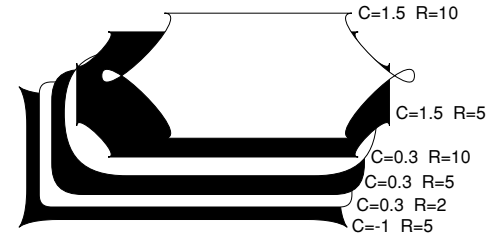C=0.3 R=10
C=0.3 R=5
C=0.3 R=2
C=-1 R=5

Figure 2. Various values of the radius (R) and curvature (C) on the resulting box.

To produce the Draw file simply drag-drop the Drawfile icon located to the right of the window somewhere. This can be a filer window, Draw or your favourite desktop publishing app. You'll probably want to alter the line width and fill colour and add text in Draw, though.

If you click on the close icon the application quits. To economise on listing space there's no code for an iconbar icon or menu. RoundBox's window can be kept next to Draw's. As a learning exercise in coding you can always add these yourself.

Listing 1

```
10REM MAKE FILES FOR TSV2DRAW
20REM (c) DRAG N DROP 2020
30:
40ON ERROR REPORT:PRINT" AT ";ERL
```

3D Graphics

Given that our computer screens are flat, the third 'depth' dimension tends to present many games and graphics programmers with a healthy dose of fear and trepidation.

This is partly because of a phobia of formulae and possibly from initial attempts that might resemble the tangle of a child's cat's cradle made of criss-crossing threads between their fingers.

However – fear not! As with all things there are degrees of difficulty and the principles of 3D projection are simpler than you might expect. The key phrase here is 3D projection whereby we take points/objects that have 3 coordinates - in our internal model:

X – a lateral position in space
Y – a vertical position in space

Z – the depth position in space i.e. how far away the point is from our point of view, which is often described as a virtual camera.

We calculate the position of this 3D point on a 2D dimensional screen. That calculation is called a *projection* and represents a transform from the 3D model held within the computer's memory to the 2D screen which can present a displayed graphic to the user.

The model in memory will occupy a three dimensional space that does not need to have the same coordinate ranges as the screen. For example -32768 to +32768 for X and Y and 1 to 4096 for Z where 1 is the camera position and 4096 is far away.

The projection follows a simple principle that the further an object is away the smaller it appears and the closer it is to the horizon.

In principle because less light reaches the observers eye the further an object is away from them the smaller they are. This occurs in accordance with an inverse square law.

Thus, where an object is 2 metres away from an observer, it will appear 1/4 the size when compared to its size 1 metre away. For 3 metres it will be 1/9 the size and so on.

However, for the sake of our projection, we can simplify this and consider that for each point of Z we can just scale our 3D space X and Y values by Z. This is called a *weak*