Picture Processing Using REXX

The 2020 International Rexx SymposiumOnline ("Covid-19")

September 29th – October 1st 2020

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Many years ago I learned how to generate BMP files using Rexx.

An algorithm computed the walls of a rectangular maze of an arbitrary size with a single entry and exit. The walls had then to be turned into Xs to be printed on our (IBM's) 1403 printer. Modern technology made me change the Xs to black blocks and the optionally printed path to a red line.

An example of such a picture you can see on

https://austria-forum.org/af/Infos_zum_AF/Editorial_Board/Pachl%2C_Walter%2C_Dipl.-Ing./Pachl%2C_Walter_english

Recently I found a challenge to manipulate a nice picture of our granddaughter which shows her with two kinds of fabric that don't quite fit together

First I transformed the given jpeg file into bmp format.

The structure of a bmp file is described in Wikipedia

https://de.wikipedia.org/wiki/Windows_Bitmap

It comprises a header of 54 bytes followed by the picture contents. The header contains the width w and height h of the picture encoded as little endian numbers.

A little function converts these to numbers as used in REXX.

```
dnel: Procedure
/*********************************************************************
* compute the number from its representation (little endian)
*********************************************************************/
Parse Arg s
sr=reverse(s)
res=c2d(sr)
say 'dnel:' c2x(s) '=>' c2x(sr) '=>' c2d(sr)
Return  res
```

The picture content follows the header in h lines, each of which contains w*3 bytes, i.e., w pixels. The order of these lines is bottom up; the first line contains the lowest line of the picture.

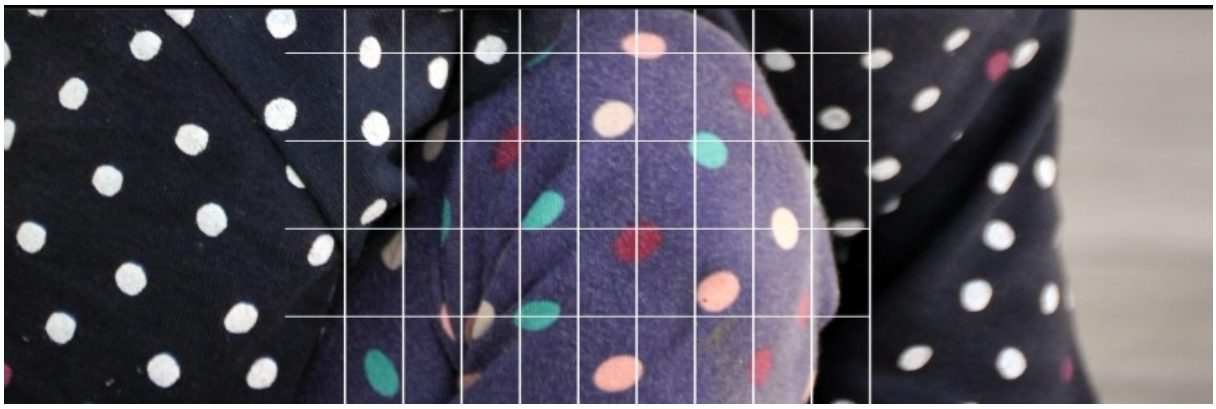
My program stores this data in an array l.i with i running from 1 to h.

The next step is to identify the area that needs to be replaced.

I do this by working on two polygons, describing the left and right border of the area, respectively.

The vertices along the line are specified as i (the line we are in) and x, in terms of bytes, from the start of the line. This takes a little trial and error.

The program can display a grid highlighting specific lines and columns.



In order to speed up the process, only the filrst 900 lines are used in these steps.

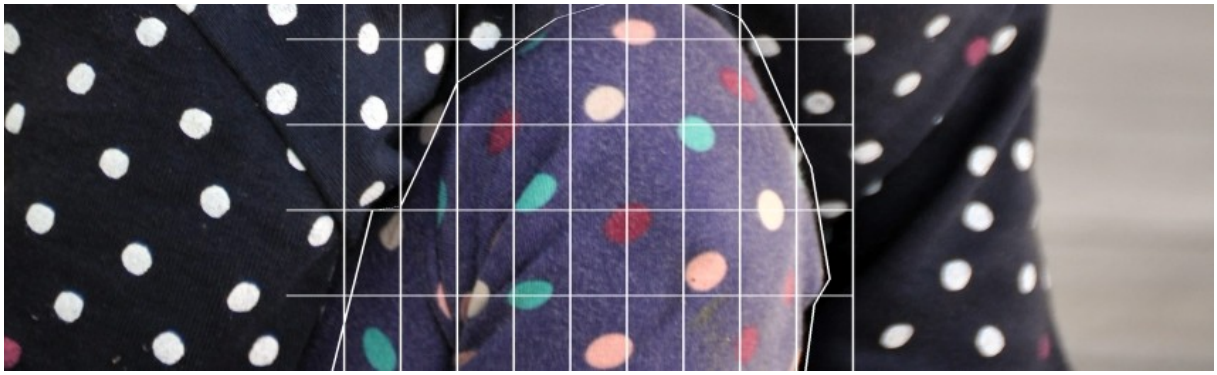
Another feature is to draw white edges according to the specified polygons. The x values for every line are computed using the segment specifications of the neighboring vertices.

The start point of a replacement must now be adjusted to a pixel boundary, i.e., it must be of the form 1+3*x.

Similarly, the length of a replacement must be a multiple of 3 (bytes).

This picture shows the boundaries.

Combining these two (grid and border) gives this:



Now we can put white pixels into all points of the replacement area thereby showing which "bad" parts of the picture will be replaced.

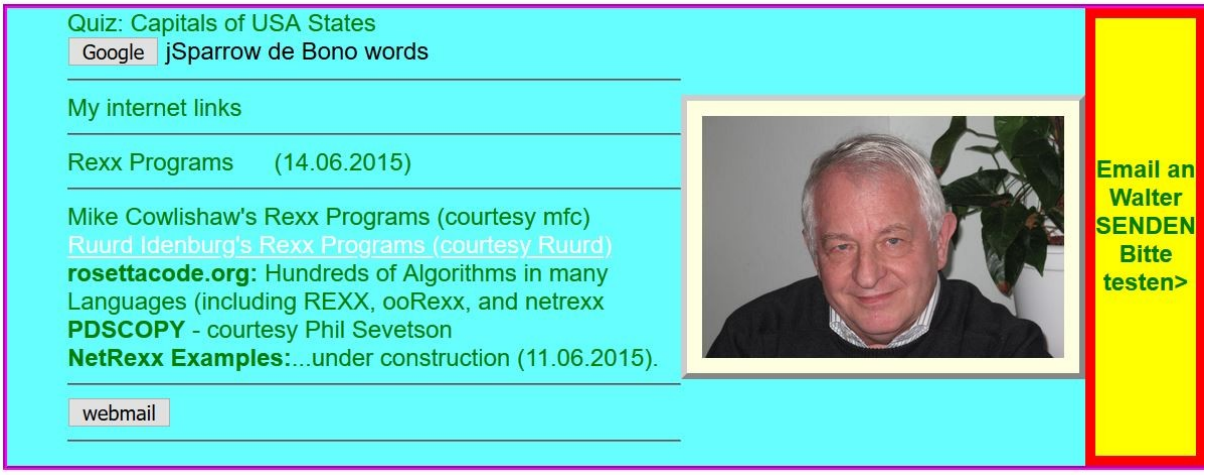
Replaced by what?

I identified an area of the picture with data suitable for replacement. Replacement strings are copied from these lines into an array r.i.

Finally, we put these r.i strings into the corresponding l.i lines and build the output file by appending the picture data to the original header (remember? t)

Some time is left?

Some years ago I created my home page www.wpachl.at which has links that I can use from anywhere:



On http://www.wpachl.at/Rexx_Programs.html you can find some of my programs that I considered worth “publishing”.

Name	Type	Description
first.rex	pgm	First Entry.
72.rex	pgm	Convert a long text file to line length 72.
compaxx.rex	pgm	Compare two (text) files line by line.
csv2txt.rex	pgm	Convert a csv file to a text file (columns aligned).
decrypt.rex	pgm	Decode an encoded file using the key phrase used.
encrypt.rex	pgm	Encode a file using a key phrase.
exists.rex	fun	Check if a specified file exists.
fn.rex	fun	Return file name.
fore.rex	fun	Determine if a program runs in the forground.
host.rex	fun	Determine if a program runs on the host.
ipod2lst.rex	pgm	List the contents of an IPOD.
mp32md.rex	pgm	Extract meta data from an mp3 file.
MusicList.rex	pgm	List mp3 files with metadata contained in a folder.
pryn.rex	fun	Prompt for Y or N.
safecrea.rex	fun	Safe file creation tool.
safecrea2.rex	fun	Safe file creation tool with append option.
wordsort.rex	fun	Sort a list of words.