

Cropping Pictures

Cropping is one of the essential functions in image processing and manipulation. Cropping an image means to cut out a certain part of the image and to discard the rest.

For instance, in the following picture, the main subject is the little girl with the snow bear. There is too much extra stuff on the edges of the picture. To have a nice picture, I would like to have the little girl with the snow bear. I would like to crop the picture as shown:



This image was originally 1094 x 821 pixels. To find the area I wanted to crop, I created a picture object for this image (`makePicture(pickAFile())`) in the Command area of JES. I then opened up Media Tools -> Picture Tool and selected this picture. By moving my mouse around, I was able to see that the upper left corner of the area I wanted to crop had x- and y-coordinates (380, 110). I then moved my mouse over to the bottom right corner of the area I wanted to crop, and found the coordinates there to be (790, 700). My cropped picture has just the girl and the snow bear and has 410 x 590 pixels.



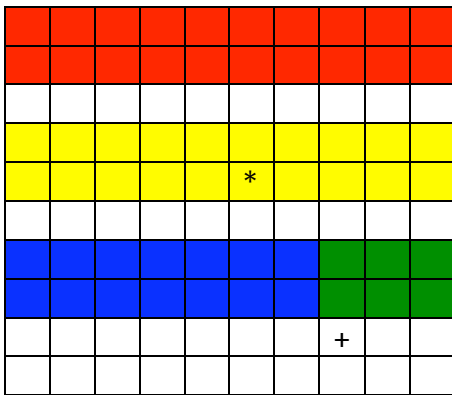
Let's now think about how we might write an algorithm to crop pictures. Given a picture, what do we need to know to crop it? We need to know the coordinates of

the pixel in the top left corner of the area we want to crop, and we need to know the width and height of the area to crop. Our algorithm might look like the following:

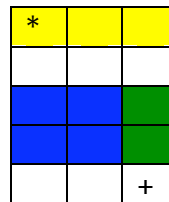
Crop Algorithm

Given a picture, x- and y-coordinates, and a width and height, do the following:

- Create a new picture with the given width and height.
- Copy the pixels from the original picture starting at the given coordinates to the pixels in the new picture.
- Return the new picture.



Suppose in this picture, we want to crop a portion of this starting at pixel (5, 4), with a width of 3 and a height of 5. We will begin copying starting at pixel (5, 4) (the pixel with the *), and continue copying all of the pixels until we get to the pixel (7, 8). This gives us the following section of the original image:



Understanding how to choose the coordinates and how to determine the width and height of the cropped section are the key ideas in how to use a crop function. You will experiment with this in the [Mini-Lab: Using copyInto and cropPicture](#).