



LD Digital Mosaic Creator

Text and images by Lasse Deleuran

Introduction

LEGO® mosaics are essentially brick-built pictures. As LEGO® creations they range from small pictures on buildings and decorations on vehicles to large portraits and even large-scale event builds. While some artists prefer to build mosaics entirely by hand, the medium is more approachable with the aid of software. Mosaic apps range from single click on-line tools to fully functional enterprise-like software that allows adjustment of absolutely everything imaginable. I'm the author of the mosaic app LDDMC, which has been developed with the aim of allowing you to easily tinker with mosaics in order to get the result just right. In this article I will give you some tips and tricks for creating good looking mosaics, and also explain some typical challenges you might face when designing mosaics for event builds.



This mosaic was built by visitors of LEGO® Charity at LEGO®world Copenhagen 2015. It is built using 2x2 plates.

Construction Techniques

When using LEGO® to draw a picture there are a range of building techniques at your disposal. The classic building technique of placing 1x1 plates on baseplates is still very common, and you can improve the level of detail by using a smaller 'pixel' such as a 1x1 plate seen from the side rather than from the top. The tradeoffs when building a mosaic like this include a higher price, longer building time and the

aesthetics of having non-square pixels. You might get a better result by selecting some regions of your mosaic and building them with 1x1 plates lying on the side. This SNOT technique requires that you either glue the parts, use fancy construction techniques or use a transparent pane to keep the mosaic intact. Consider using SNOT building only when building small images that have both vertical and horizontal details, such as the Coca Cola logo on the truck trailer. Other exotic building techniques exist, such as placing round plates on top of normal plates, or clipping on bars and antennae to add thin lines.



This is a brick-built mosaic of the famous picture by Samsø.

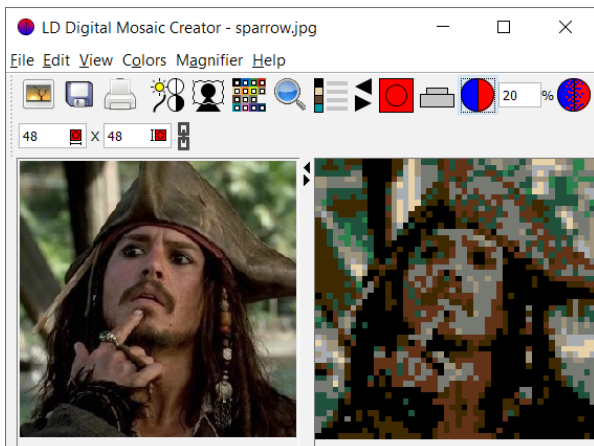


The SNOT construction technique requires a lot of pieces to keep the parts together.

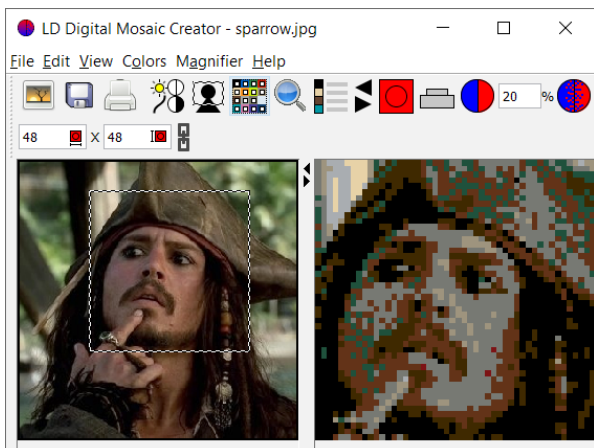
Size and cropping

When designing a mosaic you will most likely be limited to a specific size, such as a single 48x48 baseplate. While the baseplate is large, you will quickly find that it is very limiting as 48x48 is barely more than what is used for emojis nowadays. This is when the cropping tool becomes your friend: Every non-vital detail you can crop out leaves more bricks to be used for the motif. The new mosaic creator from LEGO® (seen on Leicester Square and LEGO® House) shows that you can even crop out sections of the motif in order to make portraits

more recognizable. Another handy trick used by that app is to use yellow as the background color in addition to the four grayscale colors (white, light gray, dark gray and black) for the motif. This leads us to one of the most important aspects of mosaics: colors.



This picture of Jack Sparrow is interesting. His costume and posture makes him recognizable.



By focusing on the face alone, lots of additional detail appears in the mosaic.

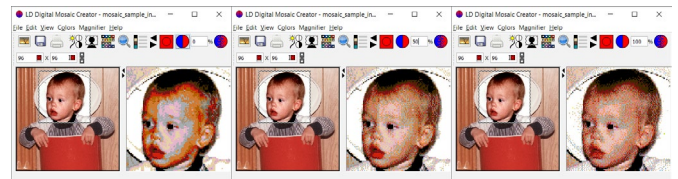
Colors

A stylish choice, especially for portraits, is to limit yourself to the four grayscale colors. You can add a fifth color either as in the LEGO® software mentioned above or by getting out your wallet and investing in some rare 'very light gray' 1x1 plates from the old LEGO® mosaic sets. Unfortunately mixing old and new gray pieces doesn't add any noteworthy detail.

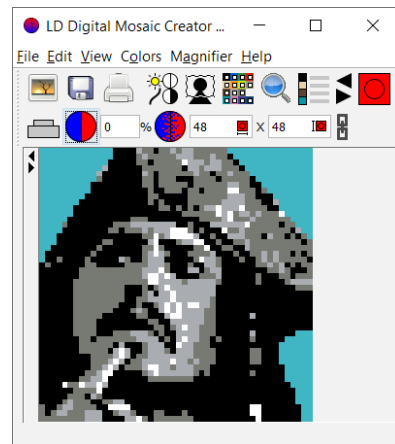
Fortunately you can get 1x1 plates in a large variety of colors, and you can design a mosaic with the specific colors you have available. Some apps even allow you to use an inventory so that it doesn't use more parts than what you have available in given colors! When designing a mosaic you have to make a choice regarding how to represent gradients and colors that are not on the LEGO® color palette. When selecting the color for a part in a mosaic, the obvious choice is to pick the LEGO® color that best approximates the original color*. This typically leaves you with a mosaic where colors are grouped in regions. For example, a portrait might become dominated by a single color for the face. 'Dithering', or 'color error correction' can be used to counteract this phenomenon. The idea behind dithering is basically to identify color deficits after the color approximation and use the colors of surrounding pixels to counteract these deficits. The study of colors is vast and well researched, and mosaic programs can often apply at least

one method for dithering an image. In LDDMC you can adjust the amount of dithering, as I have found this to be a good parameter to tinker with.

* See CIE94 and related techniques for how to measure color differences.



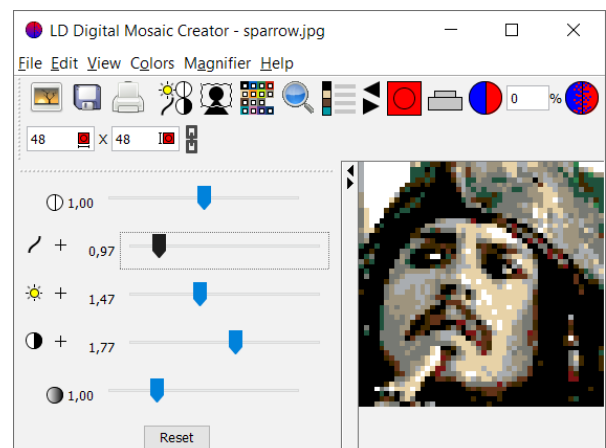
Dithering is set to 0%, 50% and 100% respectively.



Using the four grayscales and a background color.

Improving your results using filters

Sometimes it can seem impossible to get a good result no matter which colors and amount of dithering you use. This often happens in portraits where one of the gray colors typically becomes very prominent. When this happens, adjusting filters like brightness, contrast and gamma for the original picture can greatly improve the resulting mosaic. I have included these filters in LDDMC so that you don't have to reload the picture after adjusting it elsewhere. I typically increase the brightness quite a bit in order to get a good color balance, and contrast is increased to highlight details. Changing gamma has a similar effect to changing contrast (although the underlying mechanism is very different). Try it out for yourself and play around with these filters to get a good balance of colors and sharp contrasts. After doing this you might want to readjust the amount of dithering as well.



The cropped Jack Sparrow photo has been enhanced using filters.

Event Builds

Mosaics are particularly popular at event builds where NGOs or companies set up a big board or table for small LEGO® plates. Attendees build small sections of the mosaic on these plates which are then put together on the board or table to form the large mosaic. When designing such a mosaic you are faced with additional challenges to those mentioned above. In the remaining sections I will go through some recurring challenges I have faced when helping design mosaics for LEGO® Charity and their event builds at LEGO®world Copenhagen throughout the years.



LEGO® Charity was supporting BU&S (Children, Youth & Sorrow) at LEGO® World 2017 where the signature painting Party Birds was built as a LEGO® mosaic.



Attendees were given 8x16 plates to build.



Once finished, the plates were placed on a large board.

Make it fun to build

An attendee is typically given a LEGO® plate and a printout with building instructions. It is your job to make it fun to decorate the plate with colors. The fun goes away if there is only a single color on the plate or if there are so many chaotic

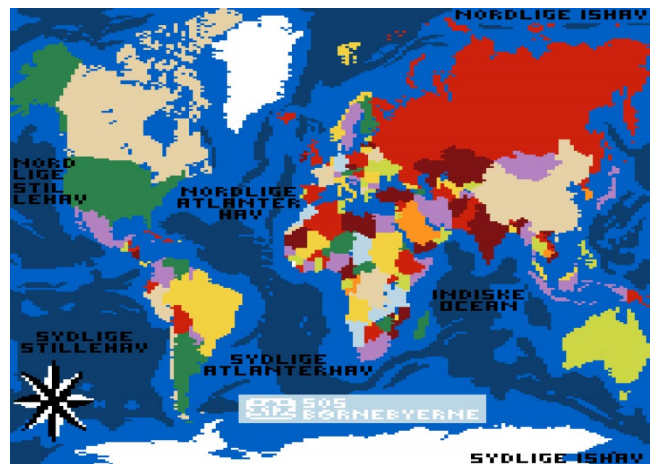
colors that the building experience becomes a chore. Find a good balance here by adjusting the amount of dithering.



For one of the mosaics the dithering was increased to make the colors of the background and flower appear closer to the original stamp. The white candle had to be completely white and this caused 22 of the 8x16 plates to be entirely white as well.

Text and logos

A large event mosaic often consists of both a photographic image and some text or a logo. The mosaic app can't distinguish between elements, so filters and dithering are applied equally over all of the mosaic. This can lead to reduced sharpness of text, or logos in the wrong colors. I always solve this problem by focusing on making the photography section look good in LDDMC first, before exporting the mosaic as a picture. The text and logos in this picture are fixed in Photoshop before being re-imported back into LDDMC from where the mosaic is printed. Make sure to save corrected logos and text as a layer in photoshop so you don't have to redo this in case you have to change the mosaic afterwards.

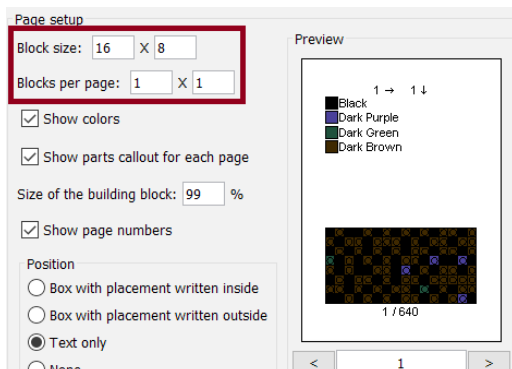


LEGO® Charity was supporting SOS Children's Villages Denmark at LEGO® World 2016. This year the mosaics were decorated maps. The text and logo were drawn by hand as described above.

Printing

The building instructions for event builds often consist of several hundreds of pages, so make sure to print to PDF in order to inspect the result before potentially wasting a lot of paper. Each page should correspond to a baseplate, which is done by setting the 'block size' to the size of the plates in the printing dialog of LDDMC. 'Block per page' should be set to 1x1. If you do not want to include a parts callout on each page, then consider increasing the 'size of the building block for each page' to 100% to fill out the page.

If your event is held in a country where attendees do not speak English, then consider translating the color names for the parts callout. You can do that by making your own translations file in the 'color_translations' folder and then restarting LDDMC to load your new file.



Setting the block size and blocks per page when printing for an event build. This example is for the Party Birds mosaic from 2017.

Sparring

Make sure that you have responsive and healthy communication with the people you are designing for. You should be prepared to potentially design a dozen mosaics before you get a result that satisfies both you and them. Backup every mosaic you create before moving on (Use 'Save as' in LDDMC and name the file accordingly) so you can return to it again at a later time. Last minute adjustments can be expected in case certain colors can't be delivered on time. An error in colors might even first be discovered at an event. In this case you should consider making color replacements.

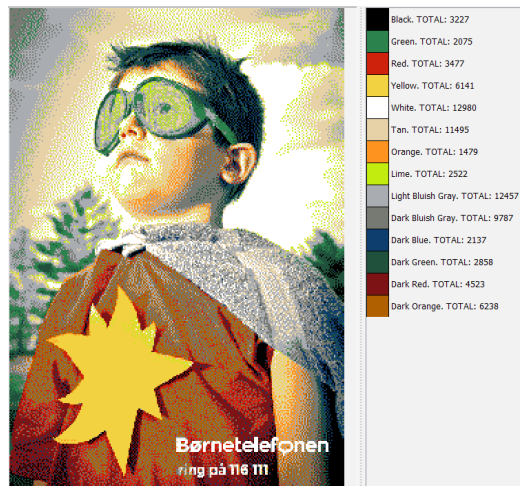
#



At LEGO® World 2018 we had to build this picture from Børns Vilkår as a mosaic.



This was the first version of the mosaic and was a good starting point.



For the second version the yellow star was made more yellow. But being completely yellow led to the previously mentioned problem of not being fun to build.



The final mosaic as it stood at the event after several rounds of feedback.