

Project 3

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Image Processing - Spring 2018

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Problem 1. Constructing and displaying a 6 - level pyramid.

Solution Figures 1 to Figure 6 display the output of this process. Figure 1 is the base image. Due to size issues, this figure had to be fit on the page in a specified width. The input size of the the base image is 1024 by 1024.

We can observe the pyramid of the images in the result.

Problem 2. Zero Order Hold Scheme

Solution This was a long process. Each level of the pyramid was expanded to be of the same size of the original image. Let us start with the level 6th level. In this case, the Image in Figure 6, was considered to be our input image. And this image was expanded to size 1024x1024. Figures 7 to 11 will give the outputs at each level. This means a 32x32 image was expanded into a 1024x1024 image. The result at each stage can be seen. As the final image is too big to fit on the page, it has been fit to page while displaying, the actual image is of 1024x1024 size, as can be observed during the demo. For simplicity sake, from the next level, that is expanding a 64x64 image to 1024x1024, from directly the output image for each level is shown. These results can be seen from Figure 11. One thing to note in this was, it can be clearly seen that the higher levels, expanded image is more distorted than the lower levels. That is, the expanded image from 512x512 is much better and clearer than the image obtained from 32x32 image.



(a) Base Image

Figure 1: Input Image 1024x1024 pixels

Problem 3. First Order Hold Scheme

Solution Each level of the pyramid obtained is expanded back to the base images size. Figures 16 to Figure 20 show the expansions using the First order hold scheme.



(a) Level 2

Figure 2: 512x512 Image



(a) Level 3

Figure 3: 256x256 Image



(a) Level 4

Figure 4: 128x128 Image



(a) Level 5

Figure 5: 64x64 Image



(a)
Level 6

Figure 6: 32x32 Image



Figure 7: Expanded to 64x64 Image



Figure 8: Expanded to 128x128 Image

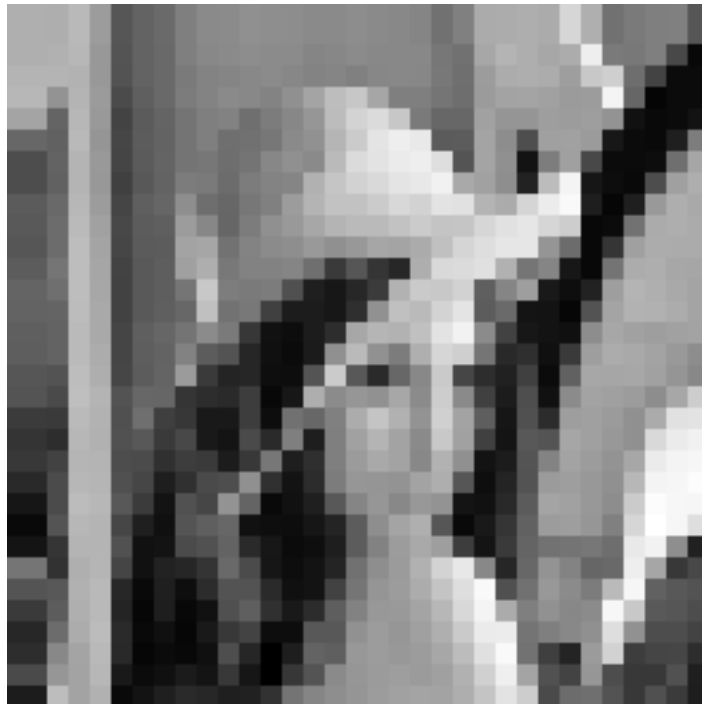


Figure 9: Expanded to 256x256 Image



Figure 10: Expanded to 512x512 Image



Figure 11: Expanded to 1024x1024 Image



Figure 12: 64x64 image expanded to 1024x1024 Image



Figure 13: 128x128 image expanded to 1024x1024 Image



Figure 14: 256x256 image expanded to 1024x1024 Image



Figure 15: 512x512 image expanded to 1024x1024 Image

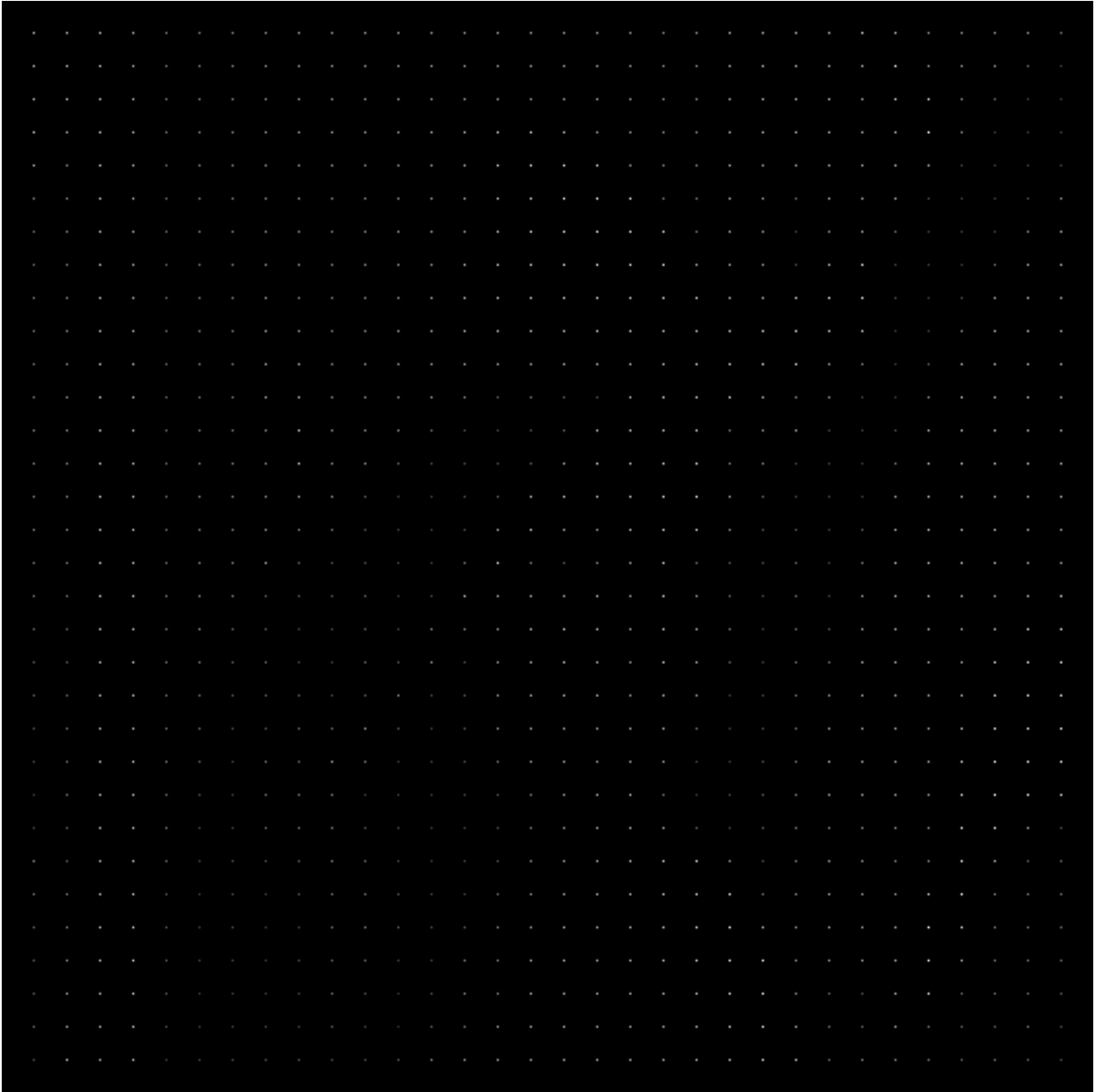


Figure 16: 32x32 image expanded to 1024x1024 Image

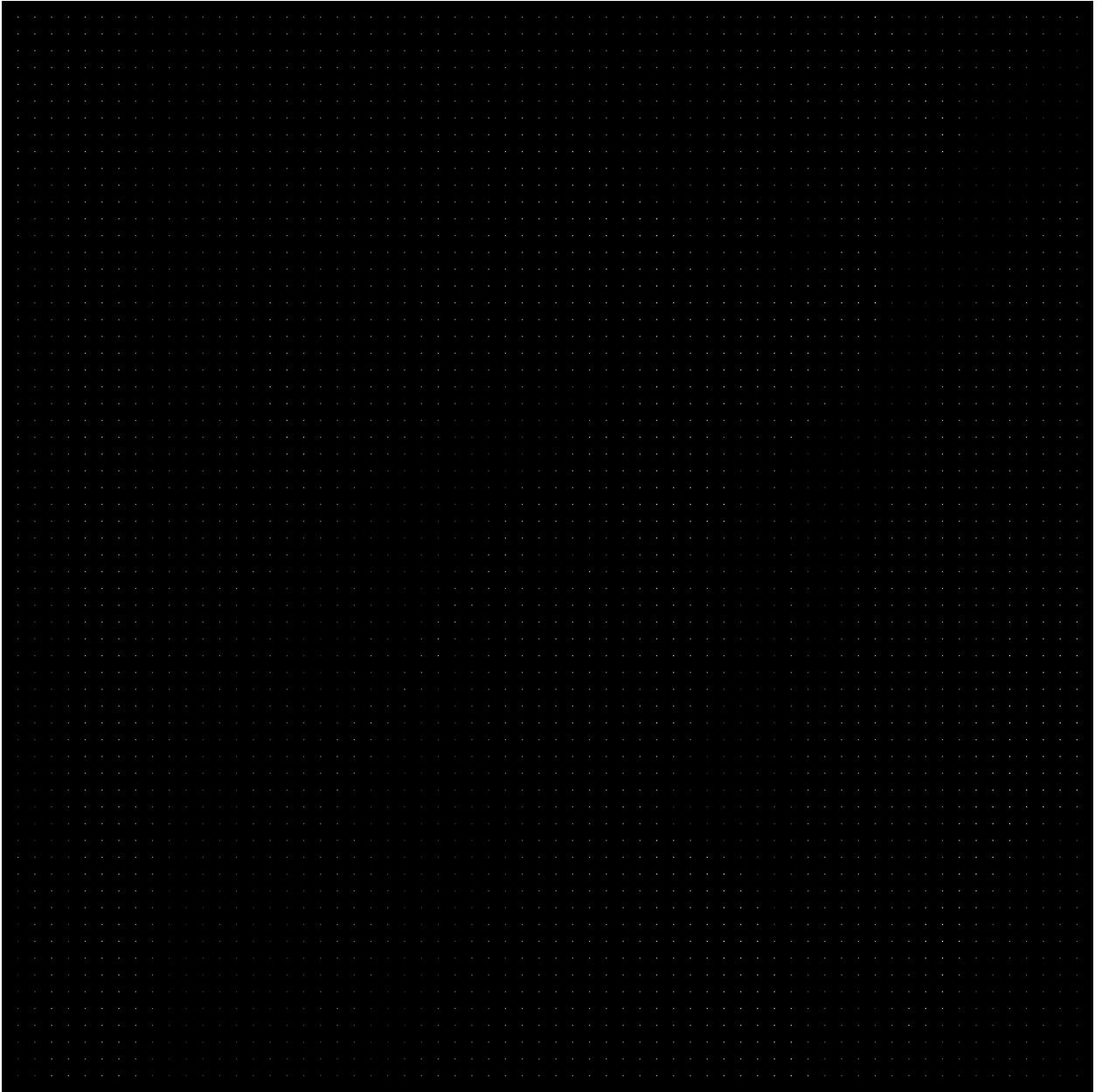


Figure 17: 64x64 image expanded to 1024x1024 Image

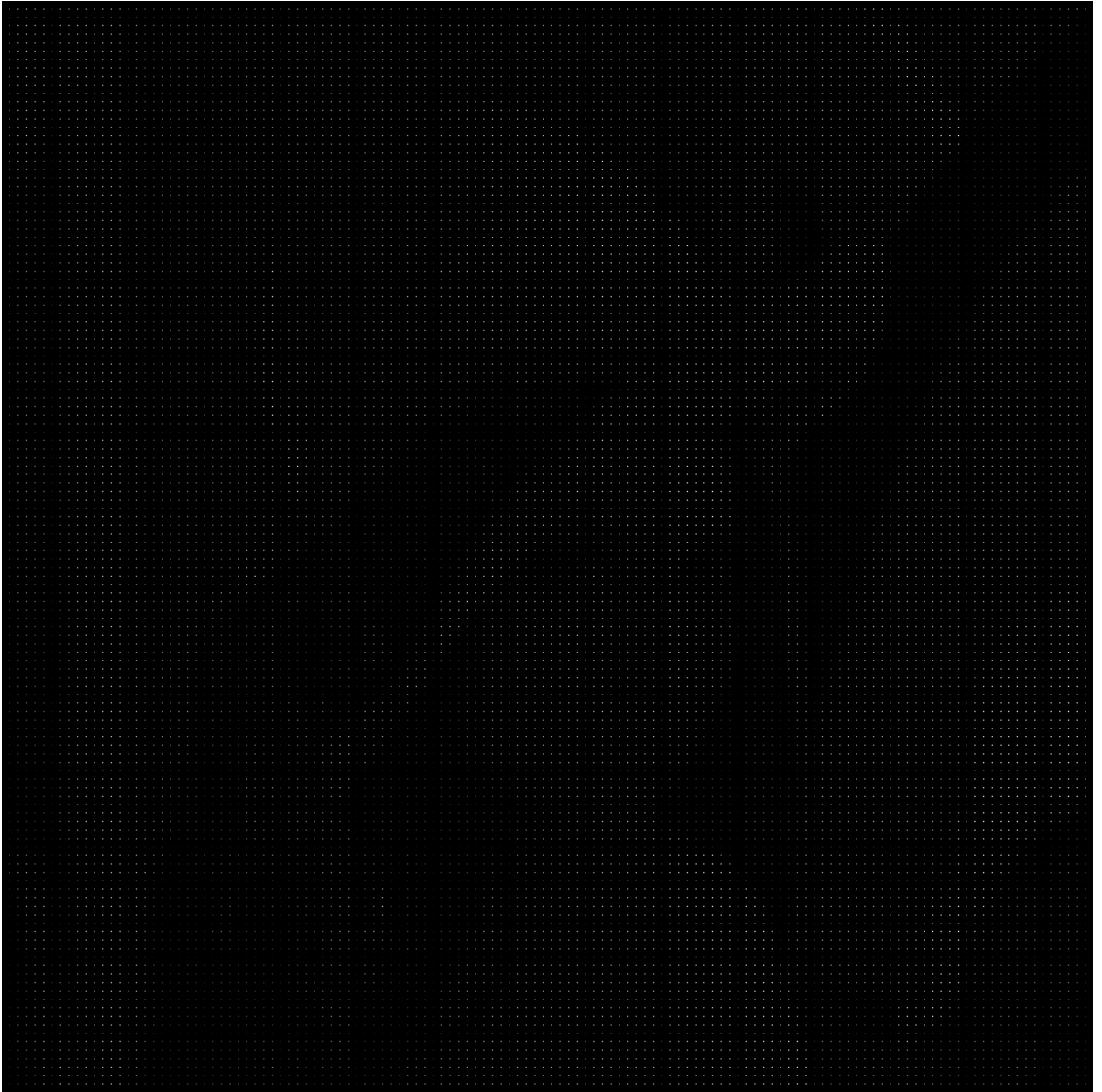


Figure 18: 128x128 image expanded to 1024x1024 Image

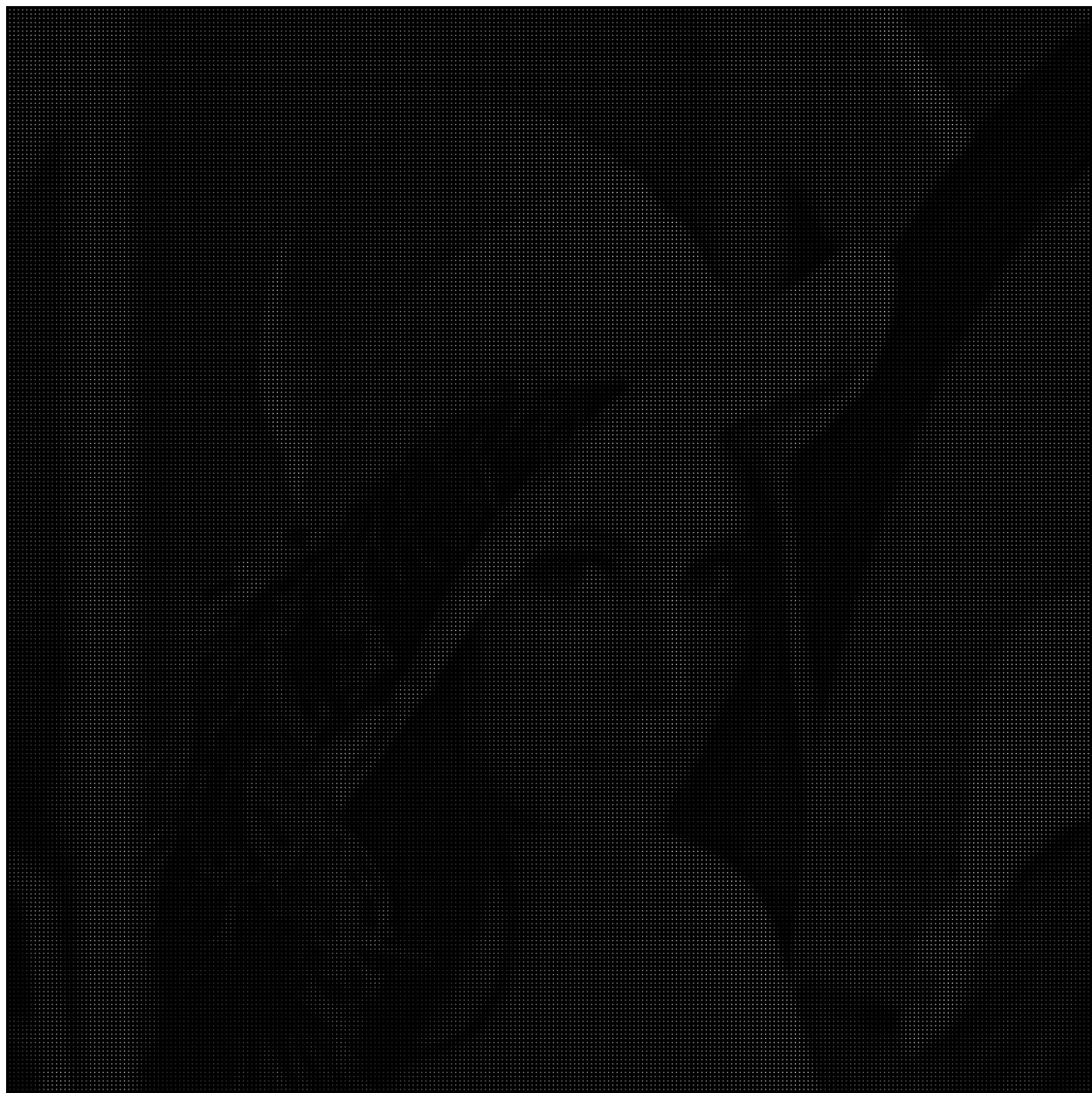


Figure 19: 256x256 image expanded to 1024x1024 Image

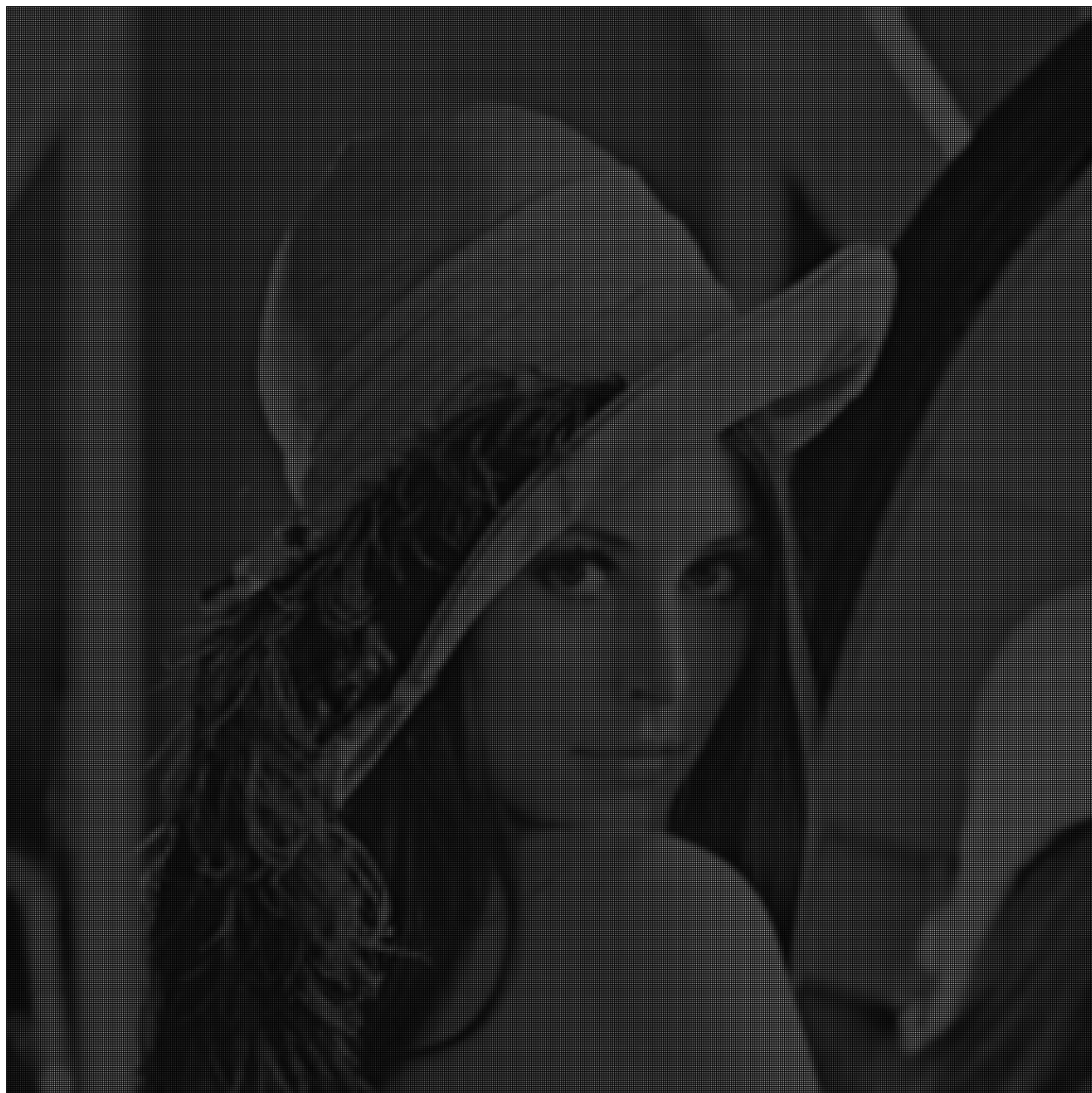


Figure 20: 512x512 image expanded to 1024x1024 Image