


```
monalisa = ;
```

```
monalisa = ColorQuantize[ColorConvert[monalisa, "Grayscale"], 2]
```

```
(ColorSeparate@ImageAdjust[monalisa])[[1]]
```

```
pos = PixelValuePositions[(ColorSeparate@ImageAdjust[monalisa])[[1]], 0.]
```

```
pos2 = PixelValuePositions[(ColorSeparate@ImageAdjust[monalisa])[[1]], 1.0]
```



```
{ {1, 117}, {3, 117}, {5, 117}, {7, 117}, {9, 117}, {11, 117}, {13, 117}, {15, 117},  
  {17, 117}, {19, 117}, {21, 117}, {23, 117}, {25, 117}, {27, 117}, {29, 117},  
  {31, 117}, {33, 117}, {35, 117}, {37, 117}, {39, 117}, {41, 117}, {43, 117},  
  ... 8655 ..., {97, 1}, {98, 1}, {99, 1}, {100, 1}, {101, 1}, {102, 1}, {103, 1},  
  {104, 1}, {105, 1}, {106, 1}, {107, 1}, {108, 1}, {109, 1}, {110, 1}, {111, 1},  
  {112, 1}, {113, 1}, {114, 1}, {115, 1}, {116, 1}, {117, 1}, {118, 1} }
```

large output

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[set size limit...](#)

```
{ {2, 117}, {4, 117}, {6, 117}, {8, 117}, {10, 117}, {12, 117}, {14, 117}, {16, 117},  
  {18, 117}, {20, 117}, {22, 117}, {24, 117}, {26, 117}, {28, 117}, {30, 117},  
  {32, 117}, {34, 117}, {36, 117}, {38, 117}, {40, 117}, {42, 117}, {44, 117},  
  {46, 117}, ... 5061 ..., {59, 1}, {60, 1}, {61, 1}, {62, 1}, {63, 1}, {64, 1},  
  {65, 1}, {66, 1}, {67, 1}, {68, 1}, {69, 1}, {70, 1}, {71, 1}, {72, 1}, {73, 1},  
  {74, 1}, {75, 1}, {76, 1}, {77, 1}, {78, 1}, {79, 1}, {80, 1}, {82, 1} }
```

large output

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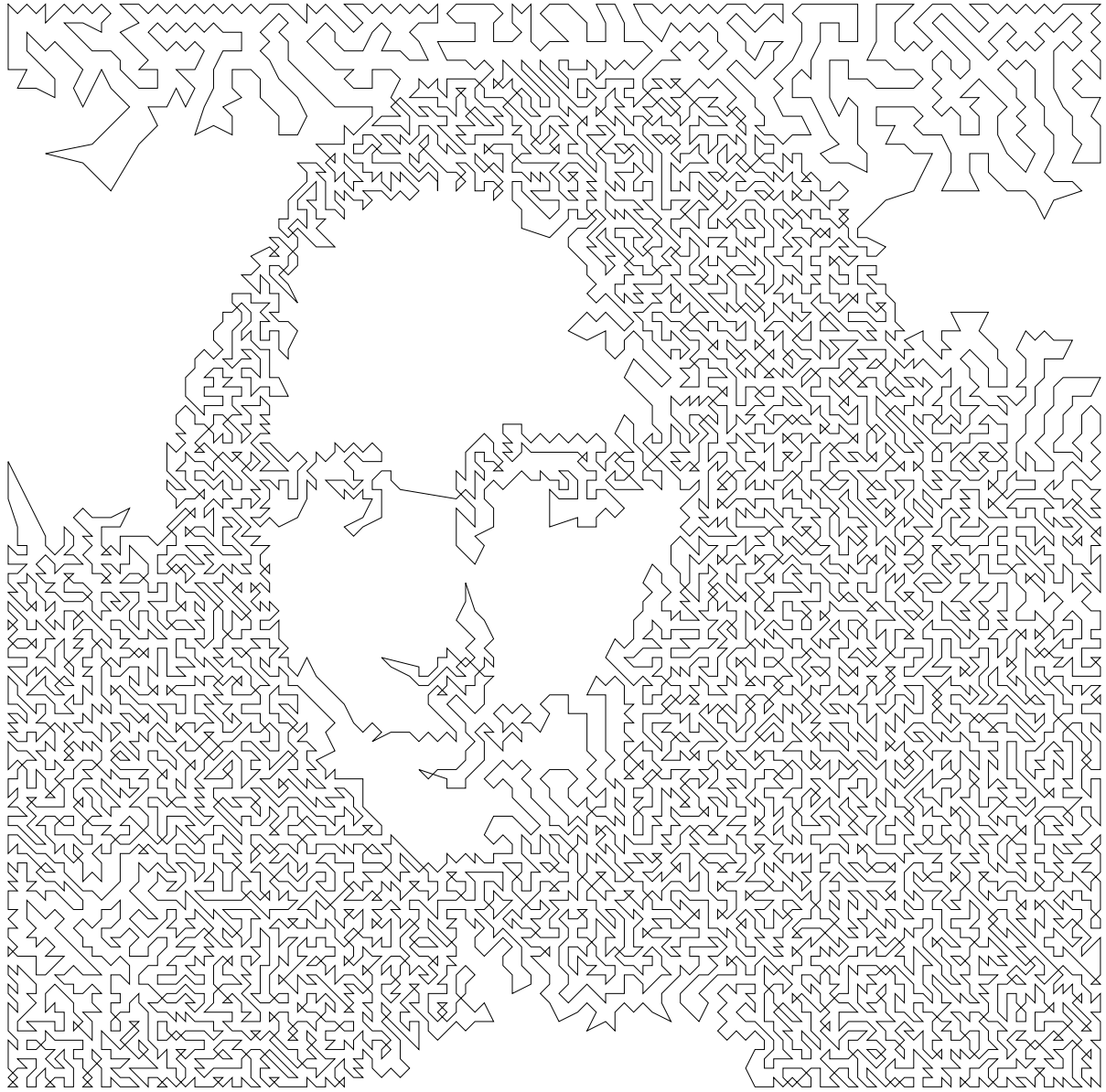
[set size limit...](#)

```
res = FindShortestTour[pos];
```

```
res2 = FindShortestTour[pos2];
```

```
Graphics[Line[pos[[res[[2]]]]]]
```

```
Graphics[Line[pos[[res2[[2]]]]]]
```





```

m = pos[[res[[2]]]]
m2 = pos[[res2[[2]]]]
Length@m

```

```

{{1, 117}, {2, 116}, {3, 117}, {4, 116}, {5, 117}, {5, 115}, {6, 116}, {7, 117},
 {8, 116}, {9, 117}, {10, 116}, {11, 117}, {12, 116}, {11, 115}, {11, 114},
 {9, 115}, {7, 115}, {8, 114}, {9, 113}, {10, 112}, {12, 112}, {13, 111},
 ... 8656 ..., {10, 108}, {9, 106}, {8, 108}, {9, 110}, {8, 111}, {7, 112},
 {6, 113}, {5, 112}, {4, 113}, {3, 114}, {3, 112}, {4, 111}, {5, 110}, {6, 109},
 {6, 107}, {4, 108}, {2, 108}, {3, 110}, {1, 110}, {1, 112}, {1, 114}, {1, 117}}

```

[large output](#)
[show less](#)
[show more](#)
[show all](#)
[set size limit...](#)

```

{{1, 117}, {4, 116}, {3, 117}, {6, 116}, {5, 117}, {8, 116}, {7, 117}, {10, 116},
 {9, 117}, {12, 116}, {11, 117}, {14, 116}, {13, 117}, {16, 116}, {15, 117},
 {18, 116}, {17, 117}, {20, 116}, {19, 117}, {22, 116}, {21, 117}, ... 5066 ...,
 {66, 106}, {60, 107}, {21, 108}, {58, 107}, {59, 107}, {19, 108}, {63, 110},
 {13, 111}, {19, 113}, {69, 115}, {17, 113}, {8, 111}, {61, 110}, {4, 111},
 {117, 112}, {14, 113}, {67, 115}, {65, 115}, {63, 115}, {2, 116}, {1, 117}}

```

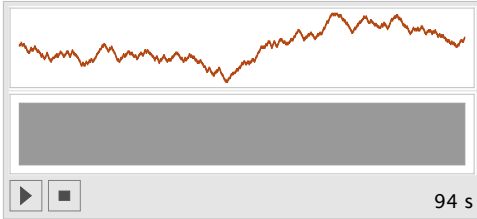
[large output](#)
[show less](#)
[show more](#)
[show all](#)
[set size limit...](#)

8700

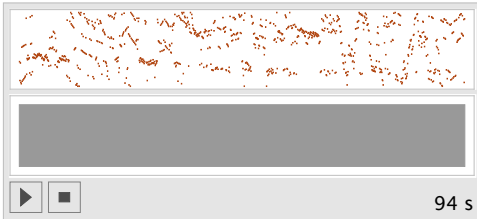
Take[m2[[All, 1]], {1000, 2000}]

{40, 10, 38, 7, 5, 63, 9, 64, 11, 65, 13, 66, 15, 17, 67, 109, 20, 45, 43, 50, 44, 45, 46, 22, 111, 68, 19, 69, 113, 24, 47, 46, 47, 52, 46, 51, 45, 50, 47, 48, 49, 52, 50, 51, 53, 50, 51, 49, 50, 51, 45, 47, 35, 45, 43, 42, 44, 48, 49, 47, 51, 46, 47, 43, 42, 41, 33, 60, 78, 62, 34, 61, 79, 80, 61, 63, 88, 87, 59, 85, 35, 77, 56, 58, 32, 31, 40, 41, 40, 39, 46, 45, 44, 45, 42, 43, 49, 44, 43, 48, 42, 49, 42, 48, 41, 44, 18, 106, 16, 43, 40, 42, 14, 104, 9, 118, 100, 116, 98, 111, 96, 109, 94, 59, 60, 61, 62, 3, 3, 5, 34, 1, 30, 118, 1, 116, 28, 114, 118, 58, 84, 57, 56, 80, 55, 116, 54, 110, 53, 78, 52, 108, 104, 102, 18, 100, 106, 51, 76, 50, 49, 74, 48, 104, 98, 16, 96, 13, 92, 94, 102, 43, 45, 47, 73, 107, 72, 37, 100, 33, 71, 105, 103, 101, 70, 20, 69, 89, 91, 41, 87, 85, 83, 40, 39, 37, 33, 17, 25, 79, 114, 12, 112, 77, 63, 113, 79, 77, 111, 62, 61, 76, 108, 110, 115, 43, 117, 44, 45, 40, 46, 41, 47, 23, 30, 81, 67, 66, 65, 64, 115, 81, 83, 85, 87, 117, 68, 6, 89, 91, 14, 93, 28, 30, 95, 84, 3, 82, 80, 1, 118, 77, 116, 75, 114, 73, 112, 71, 108, 69, 106, 67, 73, 75, 109, 60, 75, 104, 109, 42, 39, 45, 46, 41, 44, 43, 40, 44, 39, 42, 37, 40, 105, 100, 103, 39, 38, 10, 39, 35, 36, 40, 35, 36, 41, 42, 37, 37, 38, 38, 43, 38, 37, 40, 15, 34, 36, 41, 38, 41, 107, 102, 73, 72, 71, 70, 56, 98, 69, 100, 57, 102, 104, 58, 74, 59, 107, 71, 65, 104, 63, 102, 61, 100, 98, 96, 59, 67, 65, 96, 55, 54, 69, 96, 90, 99, 98, 101, 37, 115, 38, 32, 34, 39, 112, 38, 9, 37, 113, 37, 110, 36, 108, 106, 5, 118, 116, 105, 21, 118, 103, 112, 110, 101, 95, 100, 97, 110, 102, 104, 33, 99, 93, 87, 118, 86, 85, 115, 109, 98, 93, 92, 90, 84, 86, 89, 86, 82, 82, 80, 83, 84, 82, 81, 85, 35, 86, 87, 59, 37, 80, 79, 78, 77, 31, 87, 86, 91, 88, 89, 32, 34, 81, 61, 88, 83, 89, 63, 62, 82, 36, 90, 27, 27, 27, 26, 101, 89, 103, 105, 28, 30, 29, 30, 31, 94, 28, 64, 93, 63, 92, 61, 91, 28, 28, 29, 29, 110, 92, 93, 94, 87, 88, 95, 27, 26, 68, 67, 66, 64, 25, 31, 23, 112, 91, 90, 81, 73, 82, 74, 110, 84, 110, 83, 107, 108, 75, 83, 84, 85, 86, 76, 77, 115, 113, 111, 86, 112, 85, 114, 40, 41, 29, 18, 106, 1, 117, 27, 38, 28, 39, 38, 37, 36, 26, 34, 28, 27, 30, 32, 25, 113, 111, 100, 101, 102, 84, 68, 85, 67, 62, 78, 77, 78, 77, 76, 76, 61, 66, 65, 81, 98, 107, 97, 80, 96, 78, 79, 63, 62, 51, 61, 77, 95, 106, 1, 24, 25, 18, 26, 20, 28, 24, 101, 102, 25, 29, 22, 21, 27, 23, 100, 74, 75, 76, 97, 22, 71, 118, 29, 78, 88, 87, 89, 88, 86, 76, 75, 85, 73, 83, 84, 74, 26, 27, 77, 28, 114, 112, 110, 92, 29, 28, 94, 95, 96, 18, 118, 23, 20, 97, 67, 93, 94, 70, 98, 21, 22, 99, 72, 96, 95, 20, 69, 79, 91, 81, 80, 90, 89, 90, 91, 92, 93, 91, 87, 90, 89, 85, 88, 86, 81, 80, 88, 70, 87, 69, 68, 85, 77, 86, 79, 83, 84, 87, 86, 82, 78, 81, 85, 87, 84, 80, 82, 86, 83, 85, 81, 84, 80, 83, 82, 81, 69, 71, 72, 23, 24, 25, 108, 91, 90, 106, 104, 89, 27, 93, 114, 112, 19, 18, 110, 92, 25, 24, 87, 101, 21, 114, 99, 86, 102, 88, 26, 91, 108, 90, 105, 88, 22, 85, 23, 89, 104, 113, 106, 111, 107, 108, 97, 96, 87, 69, 88, 70, 51, 52, 38, 37, 28, 49, 50, 39, 22, 23, 18, 3, 19, 24, 51, 66, 65, 50, 53, 51, 49, 60, 59, 40, 41, 49, 29, 39, 54, 73, 92, 75, 76, 93, 103, 104, 94, 105, 118, 116, 22, 116, 20, 114, 115, 21, 113, 102, 91, 101, 112, 110, 117, 106, 115, 109, 98, 99, 100, 90, 89, 71, 50, 49, 68, 43, 33, 27, 26, 32, 25, 26, 29, 25, 24, 32, 31, 41, 67, 86, 95, 85, 66, 40, 29, 23, 28, 24, 27, 23, 11, 10, 3, 112, 97, 70, 101, 29, 51, 96, 111, 95, 28, 100, 20, 96, 21, 22, 102, 103, 72, 104, 105, 75, 74, 100, 117, 102, 101, 118, 12, 19, 18, 16, 11, 10, 116, 99, 115, 114, 98, 113, 8, 13, 5, 7, 14, 27, 39, 41, 28, 30, 20, 13, 14, 17, 21, 37, 51, 49, 62, 64, 67, 74, 73, 75, 52, 59, 60, 64, 82, 83, 99, 108, 109, 110, 23, 24, 115, 116, 105, 88, 73, 66, 81, 81, 80, 79, 63, 69, 86, 104, 103, 87, 71, 64, 80, 79, 75, 49, 76, 77, 51, 26, 13, 112, 12, 24, 38, 25, 11, 111, 110, 8, 109, 9, 22, 21, 27, 23, 28, 73, 64, 75, 62, 26, 59, 53, 25, 20, 6, 5, 106, 105, 2, 1, 104, 103, 78, 108, 107, 77, 76, 106, 27, 102, 13, 101, 26, 25, 24, 99, 23, 98, 11, 100, 12, 85, 86, 14, 87, 16, 104, 105, 17, 18, 106, 107, 71, 73, 74, 75, 110, 76, 114, 77, 115, 116, 85, 84, 113, 82, 81, 107, 7, 108}

```
a = Sound[
  (SoundNote[#, 0.1, "Woodblock"] & /@ (Take[m[[All, 1]] - 60, {1000, 2000})), {0, 94}]
```



```
b = Sound[(SoundNote[#, 0.1, "Woodblock"] & /@ (Take[m2[[All, 1]] - 60, {1000, 2000}))),
  {0, 94}]
```



```
Export["mona.mid", Sound[{a, b}]];
Export["mona.mid", b];
```