

```
In[1]:= monalisa = ;
```

```
In[2]:= 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]
```

```
Out[2]=
```



```
Out[3]=
```



```
Out[4]=
```

```
{ {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

[show less](#)

[show more](#)

[show all](#)

[set size limit...](#)

```
Out[5]=
```

```
{ {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

[show less](#)

[show more](#)

[show all](#)

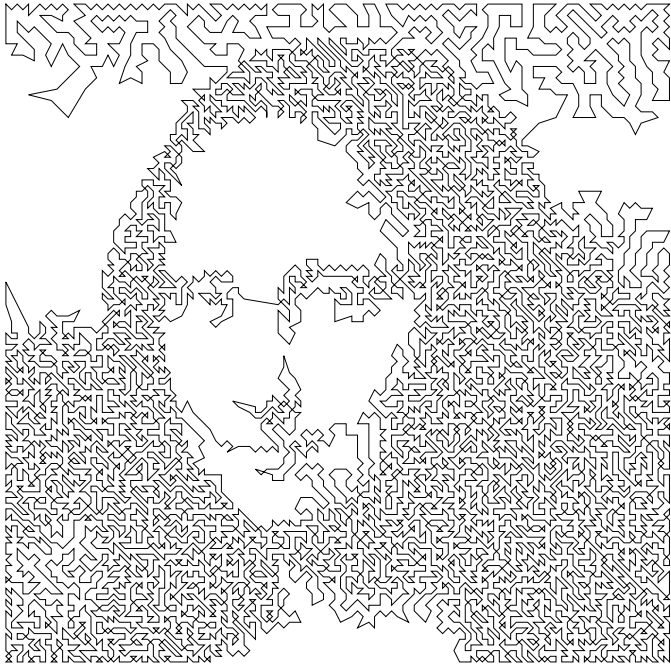
[set size limit...](#)

```
In[8]:= res = FindShortestTour[pos];  
res2 = FindShortestTour[pos2];
```

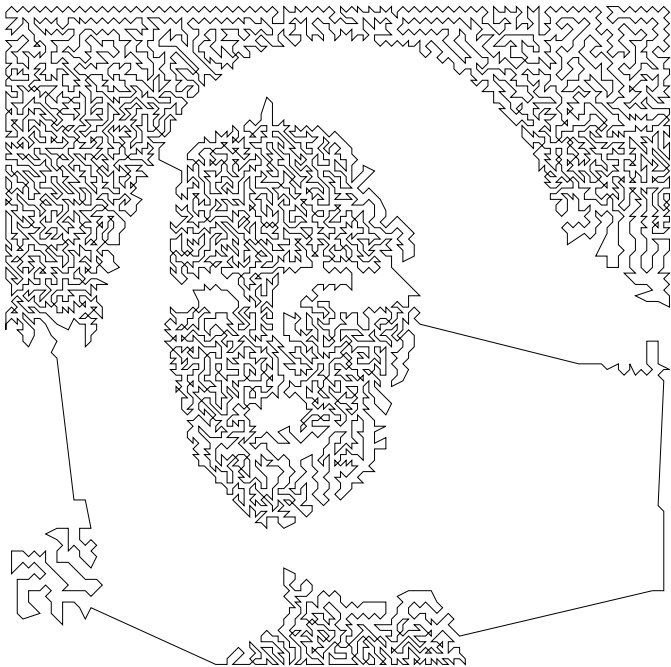
```
In[10]:= Graphics[Line[pos[[res[[2]]]]]]
```

```
Graphics[Line[pos2[[res2[[2]]]]] (* pos2 was pos before *)
```

Out[10]=



Out[11]=



```
In[12]:= m = pos[[res[[2]]]]
m2 = pos2[[res2[[2]]]]
Length@m
```

Out[12]=

```
{ {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...](#)

Out[13]=

```
{ {2, 117}, {3, 116}, {4, 117}, {5, 116}, {6, 117}, {7, 116}, {8, 117}, {9, 116},
  {10, 117}, {11, 116}, {12, 117}, {13, 116}, {14, 117}, {15, 116}, {16, 117},
  {17, 116}, {18, 117}, {19, 116}, {20, 117}, {21, 116}, {22, 117}, {23, 116},
  ... 5064 ..., {7, 108}, {8, 109}, {8, 110}, {7, 111}, {6, 110}, {7, 110},
  {6, 111}, {6, 112}, {5, 113}, {5, 114}, {4, 115}, {4, 114}, {3, 113}, {2, 112},
  {2, 113}, {1, 113}, {2, 114}, {3, 115}, {2, 115}, {1, 115}, {1, 116}, {2, 117} }
```

large output

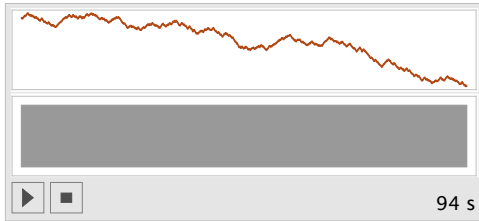
[show less](#)[show more](#)[show all](#)[set size limit...](#)

Out[14]= 8700

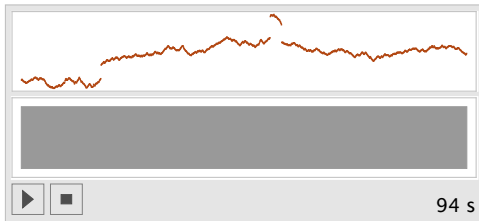
**Take**[m2[[All, 1]], {1000, 2000}]

```
{40, 10, 38, 7, 5, 63, 9, 64, 11, 65, 13, 66, 15, 17, 67, 109, 20, 45, 43, 50, 44, 45, 46,
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 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, {2000, 3000})), {0, 94}]
```



```
b = Sound[(SoundNote[#, 0.1, "Woodblock"] & /@ (Take[m2[[All, 1]] - 60, {2000, 3000})),  
  {0, 94}]
```



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

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

```
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40, 40, 40, 41, 41, 41, 40, 41, 42, 43, 44, 44, 44, 44, 43, 42, 41, 42, 41, 40}
```

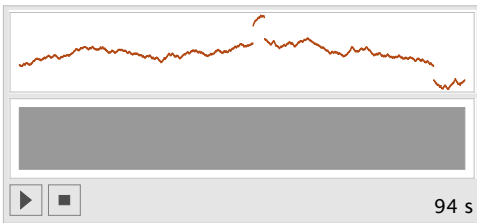
```
In[15]:= mm = (m[[All, 1]][[1 ;; 8700 ;; 8]]);
mm2 = (m2[[All, 1]][[1 ;; Length@m2 ;; 5]]);
```

**Length@mm2**

1022

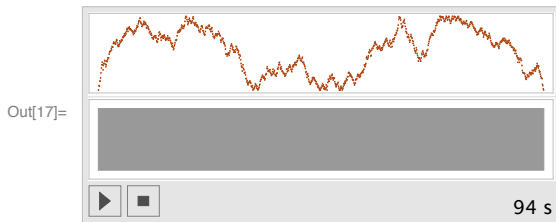
```
a = Sound [ ( SoundNote [ # , 0.1 , "Woodblock" ] & /@
  ( Take [ Reverse [ m [ [ All , 1 ] ] ] - 60 , { 2000 , 3000 } ] ) ) , { 0 , 94 } ]
Sound [ Take [ SoundNote [ - 60 + Integer [ ] , 0.1 , Woodblock ] ,
  SoundNote [ { 2000 , 3000 } , 0.1 , Woodblock ] ] , { 0 , 94 } ]
```

```
b = Sound [ ( SoundNote [ # , 0.1 , "Woodblock" ] & /@
  ( Take [ Reverse [ m2 [ [ All , 1 ] ] ] - 60 , { 2000 , 3000 } ] ) ) , { 0 , 94 } ]
```

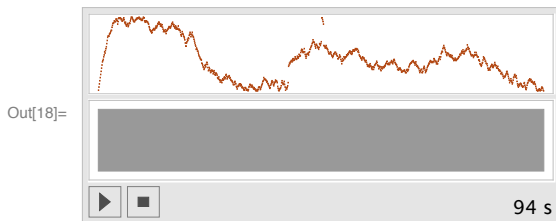


```
Export [ "monaREV.mid" , Sound [ { a , b } ] ] ;
```

```
In[17]:= a = Sound [ ( SoundNote [ # , 0.1 , "Woodblock" ] & /@ ( mm - 60 ) ) , { 0 , 94 } ]
```



```
In[18]:= b = Sound [ ( SoundNote [ # , 0.1 , "Woodblock" ] & /@ ( mm2 - 60 ) ) , { 0 , 94 } ]
```



```
In[27]:= Export [ $UserDocumentsDirectory <> "monaB.mid" , a ] ;
Export [ $UserDocumentsDirectory <> "monaW.mid" , b ] ;
```