

Pensieve header: What's the width of GST48?

```
In[ ]:= PD[GST48] = PD[
  X[01, 15, 02, 14], X[29, 02, 30, 03],
  X[40, 04, 41, 03], X[04, 44, 05, 43], X[05, 26, 06, 27],
  X[95, 07, 96, 06], X[07, 01, 08, 96], X[08, 14, 09, 13],
  X[28, 09, 29, 10], X[41, 11, 42, 10],
  X[11, 43, 12, 42], X[12, 27, 13, 28], X[15, 31, 16, 30],
  X[61, 16, 62, 17], X[72, 17, 73, 18],
  X[83, 18, 84, 19], X[34, 20, 35, 19], X[20, 89, 21, 90],
  X[92, 21, 93, 22], X[22, 79, 23, 80],
  X[23, 68, 24, 69], X[24, 57, 25, 58], X[56, 25, 57, 26],
  X[31, 63, 32, 62], X[32, 74, 33, 73],
  X[33, 85, 34, 84], X[35, 50, 36, 51], X[81, 37, 82, 36],
  X[70, 38, 71, 37], X[59, 39, 60, 38],
  X[54, 39, 55, 40], X[55, 45, 56, 44], X[45, 59, 46, 58],
  X[46, 70, 47, 69], X[47, 81, 48, 80],
  X[91, 49, 92, 48], X[49, 91, 50, 90], X[82, 52, 83, 51],
  X[71, 53, 72, 52], X[60, 54, 61, 53],
  X[74, 63, 75, 64], X[85, 64, 86, 65], X[65, 76, 66, 77],
  X[66, 87, 67, 88], X[94, 67, 95, 68],
  X[86, 75, 87, 76], X[77, 88, 78, 89], X[93, 78, 94, 79] ];
```

```
In[ ]:= Width[pd_PD] :=
  Max[Length /@ FoldList[Complement[#1 ∪ #2, #1 ∩ #2] &, {}, List @@ List @@@ pd]]
```

```
In[ ]:= Width[PD@GST48]
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Out[ ]:= 28
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```
In[ ]:= ThinPosition[K_] := Module[{todo, done, pd, c},
  todo = List @@ PD@K; done = {}; pd = PD[];
  While[todo != {},
    AppendTo[pd, c = RandomChoice@MaximalBy[todo, Length[done ∩ List @@ #] &]];
    todo = DeleteCases[todo, c];
    done = done ∪ List @@ c;
  pd];
ThinPosition[K_, n_] := First@MinimalBy[Table[ThinPosition[K], n], Width]
```

```
In[ ]:= Short[tab = Table[Width@ThinPosition@GST48, 10000]]
```

```
Out[ ]//Short= {14, 14, 18, 14, 12, 16, 12, 16, 12, 14, 12, 12, 12, 18, 12,
  12, 12, 12, 18, 12, 14, 14, 12, 18, <<9952>>, 14, 12, 12, 12, 12, 14,
  12, 16, 12, 12, 12, 14, 12, 14, 16, 14, 12, 14, 16, 12, 12, 12, 12, 14}
```

```
In[ ]:= Tally[tab] // Sort
```

```
Out[ ]:= {{12, 4806}, {14, 2676}, {16, 2039}, {18, 447}, {20, 30}, {22, 2}}
```

In[]:= **ThinPosition**[**GST48**, **1000**]

Out[]:= PD[X[5, 26, 6, 27], X[4, 44, 5, 43], X[40, 4, 41, 3], X[41, 11, 42, 10], X[11, 43, 12, 42],
X[12, 27, 13, 28], X[28, 9, 29, 10], X[29, 2, 30, 3], X[8, 14, 9, 13], X[1, 15, 2, 14],
X[7, 1, 8, 96], X[95, 7, 96, 6], X[15, 31, 16, 30], X[55, 45, 56, 44], X[54, 39, 55, 40],
X[56, 25, 57, 26], X[24, 57, 25, 58], X[45, 59, 46, 58], X[59, 39, 60, 38], X[60, 54, 61, 53],
X[61, 16, 62, 17], X[31, 63, 32, 62], X[94, 67, 95, 68], X[23, 68, 24, 69], X[46, 70, 47, 69],
X[70, 38, 71, 37], X[71, 53, 72, 52], X[72, 17, 73, 18], X[32, 74, 33, 73], X[74, 63, 75, 64],
X[33, 85, 34, 84], X[83, 18, 84, 19], X[34, 20, 35, 19], X[82, 52, 83, 51], X[85, 64, 86, 65],
X[35, 50, 36, 51], X[81, 37, 82, 36], X[47, 81, 48, 80], X[22, 79, 23, 80],
X[93, 78, 94, 79], X[86, 75, 87, 76], X[66, 87, 67, 88], X[65, 76, 66, 77], X[77, 88, 78, 89],
X[20, 89, 21, 90], X[92, 21, 93, 22], X[49, 91, 50, 90], X[91, 49, 92, 48]]