



State Machines Inferred

This file contains state machines inferred by the abstraction-based minimization algorithm.

Inferred from Real Traces

Parallel Speed
Parallel Steering
Reverse Speed
Reverse Steering

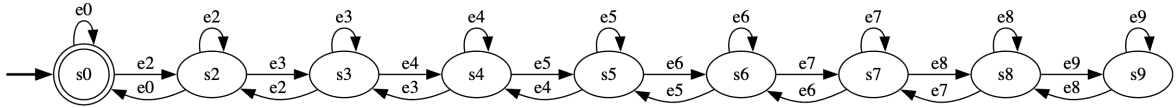
Inferred from Simulated Traces

Driver Side Reverse Speed
Driver Side Reverse Steering
Passenger Side Reverse Speed
Passenger Side Reverse Steering
Driver Side Reverse Steering (Fine Abstraction)

Inferred from Real Traces

Parallel Speed

9 states, 25 edges



▼ Edge Abstraction

$e_0 : \text{major} = 0 \wedge \text{minor} \in [0, 64)$ $e_1 : \text{major} = 0 \wedge \text{minor} \in [64, 128)$ $e_2 : \text{major} = 0 \wedge \text{minor} \in [128, 192)$
 $e_3 : \text{major} = 0 \wedge \text{minor} \in [192, 256)$ $e_4 : \text{major} = 1 \wedge \text{minor} \in [0, 64)$ $e_5 : \text{major} = 1 \wedge \text{minor} \in [64, 128)$
 $e_6 : \text{major} = 1 \wedge \text{minor} \in [128, 192)$ $e_7 : \text{major} = 1 \wedge \text{minor} \in [192, 256)$ $e_8 : \text{major} = 2 \wedge \text{minor} \in [0, 64)$
 $e_9 : \text{major} = 2 \wedge \text{minor} \in [64, 128)$ $e_{10} : \text{major} = 2 \wedge \text{minor} \in [128, 192)$ $e_{11} : \text{major} = 2 \wedge \text{minor} \in [192, 256)$

▼ Source Code

```
digraph {
  rankdir=LR
  fake [style=invisible]
  s0 [(root=true shape=doublecircle)]
  s2
  s3
  s4
  s5
  s6
  s7
  s8
  s9
  fake --> s0 [style=bold]
  s5 --> s4 [label=e4]
  s8 --> s8 [label=e8]
  s6 --> s7 [label=e7]
  s7 --> s7 [label=e7]
  s9 --> s8 [label=e8]
  s5 --> s6 [label=e6]
  s3 --> s3 [label=e3]
  s4 --> s5 [label=e5]
  s4 --> s3 [label=e3]
  s5 --> s5 [label=e5]
  s2 --> s0 [label=e0]
  s3 --> s2 [label=e2]
  s0 --> s0 [label=e0]
  s7 --> s8 [label=e8]
```

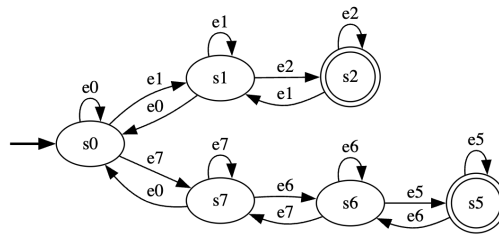
```

s0 -> s2 [label=e2]
s2 -> s3 [label=e3]
s8 -> s9 [label=e9]
s9 -> s9 [label=e9]
s8 -> s7 [label=e7]
s7 -> s6 [label=e6]
s2 -> s2 [label=e2]
s3 -> s4 [label=e4]
s6 -> s5 [label=e5]
s4 -> s4 [label=e4]
s6 -> s6 [label=e6]
}

```

Parallel Steering

6 states, 16 edges



▼ Edge Abstraction

$e_0 : \text{major} = 0 \wedge \text{minor} \in [0, 128)$
 $e_1 : \text{major} = 0 \wedge \text{minor} \in [128, 256)$
 $e_2 : \text{major} = 1 \wedge \text{minor} \in [0, 128)$
 $e_3 : \text{major} = 1 \wedge \text{minor} \in [128, 256)$
 $e_4 : \text{major} = 14 \wedge \text{minor} \in [0, 128)$
 $e_5 : \text{major} = 14 \wedge \text{minor} \in [128, 256)$
 $e_6 : \text{major} = 15 \wedge \text{minor} \in [0, 128)$
 $e_7 : \text{major} = 15 \wedge \text{minor} \in [128, 256)$

▼ Source Code

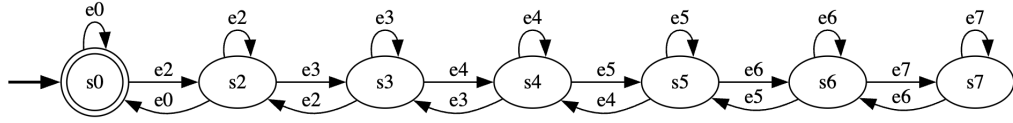
```

digraph {
  rankdir=LR
  fake [style=invisible]
  s0 [root=true]
  s1
  s2 [shape=doublecircle]
  s5 [shape=doublecircle]
  s6
  s7
  fake -.-> s0 [style=bold]
  s1 -> s2 [label=e2]
  s1 -> s0 [label=e0]
  s1 -> s1 [label=e1]
  s5 -> s6 [label=e6]
  s6 -> s5 [label=e5]
  s2 -> s1 [label=e1]
  s6 -> s6 [label=e6]
  s7 -> s7 [label=e7]
  s5 -> s5 [label=e5]
  s0 -> s7 [label=e7]
  s7 -> s6 [label=e6]
  s0 -> s0 [label=e0]
  s2 -> s2 [label=e2]
  s0 -> s1 [label=e1]
  s7 -> s0 [label=e0]
  s6 -> s7 [label=e7]
}

```

Reverse Speed

7 states, 19 edges



▼ Edge Abstraction

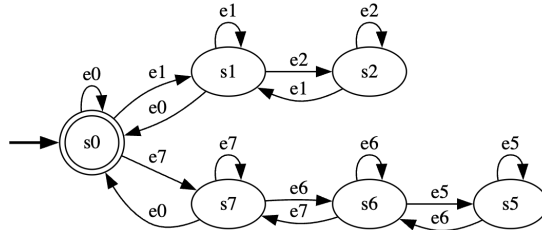
$e_0 : \text{major} = 0 \wedge \text{minor} \in [0, 64)$ $e_1 : \text{major} = 0 \wedge \text{minor} \in [64, 128)$ $e_2 : \text{major} = 0 \wedge \text{minor} \in [128, 192)$
 $e_3 : \text{major} = 0 \wedge \text{minor} \in [192, 256)$ $e_4 : \text{major} = 1 \wedge \text{minor} \in [0, 64)$ $e_5 : \text{major} = 1 \wedge \text{minor} \in [64, 128)$
 $e_6 : \text{major} = 1 \wedge \text{minor} \in [128, 192)$ $e_7 : \text{major} = 1 \wedge \text{minor} \in [192, 256)$ $e_8 : \text{major} = 2 \wedge \text{minor} \in [0, 64)$
 $e_9 : \text{major} = 2 \wedge \text{minor} \in [64, 128)$ $e_{10} : \text{major} = 2 \wedge \text{minor} \in [128, 192)$ $e_{11} : \text{major} = 2 \wedge \text{minor} \in [192, 256)$

▼ Source Code

```
digraph {
  rankdir=LR
  fake [style=invisible]
  s0 [[root=true shape=doublecircle]]
  s2
  s3
  s4
  s5
  s6
  s7
  fake -.-> s0 [style=bold]
  s6 -.-> s6 [label=e6]
  s7 -.-> s6 [label=e6]
  s2 -.-> s3 [label=e3]
  s3 -.-> s2 [label=e2]
  s7 -.-> s7 [label=e7]
  s6 -.-> s7 [label=e7]
  s6 -.-> s5 [label=e5]
  s0 -.-> s2 [label=e2]
  s5 -.-> s6 [label=e6]
  s2 -.-> s2 [label=e2]
  s3 -.-> s4 [label=e4]
  s4 -.-> s4 [label=e4]
  s4 -.-> s5 [label=e5]
  s5 -.-> s4 [label=e4]
  s0 -.-> s0 [label=e0]
  s5 -.-> s5 [label=e5]
  s3 -.-> s3 [label=e3]
  s2 -.-> s0 [label=e0]
  s4 -.-> s3 [label=e3]
}
```

Reverse Steering

6 states, 16 edges



▼ Edge Abstraction

$$\begin{aligned}
e_0 : \text{major} = 0 \wedge \text{minor} \in [0, 128) & \quad e_1 : \text{major} = 0 \wedge \text{minor} \in [128, 256) & \quad e_2 : \text{major} = 1 \wedge \text{minor} \in [0, 128) \\
e_3 : \text{major} = 1 \wedge \text{minor} \in [128, 256) & \quad e_4 : \text{major} = 14 \wedge \text{minor} \in [0, 128) & \quad e_5 : \text{major} = 14 \wedge \text{minor} \in [128, 256) \\
e_6 : \text{major} = 15 \wedge \text{minor} \in [0, 128) & \quad e_7 : \text{major} = 15 \wedge \text{minor} \in [128, 256)
\end{aligned}$$

▼ Source Code

```

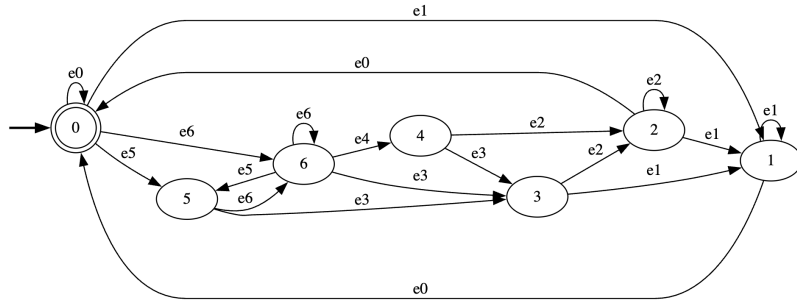
digraph {
  rankdir=LR
  fake [style=invisible]
  s0 [root=true shape=doublecircle]
  s1
  s2
  s5
  s6
  s7
  fake -.-> s0 [style=bold]
  s5 -.-> s6 [label=e6]
  s0 -.-> s1 [label=e1]
  s1 -.-> s0 [label=e0]
  s5 -.-> s5 [label=e5]
  s7 -.-> s0 [label=e0]
  s1 -.-> s1 [label=e1]
  s0 -.-> s0 [label=e0]
  s1 -.-> s2 [label=e2]
  s6 -.-> s7 [label=e7]
  s7 -.-> s6 [label=e6]
  s0 -.-> s7 [label=e7]
  s2 -.-> s1 [label=e1]
  s7 -.-> s7 [label=e7]
  s6 -.-> s5 [label=e5]
  s6 -.-> s6 [label=e6]
  s2 -.-> s2 [label=e2]
}

```

Inferred from Simulated Traces

Driver Side Reverse Speed

7 states, 19 edges



▼ Edge Abstraction: $e_i : \text{speed} \in [i \cdot 0.3, (i + 1) \cdot 0.3)$

$$\begin{aligned}
e_0 : \text{speed} \in [0, 0.3) & \quad e_1 : \text{speed} \in [0.3, 0.6) & \quad e_2 : \text{speed} \in [0.6, 0.9) & \quad e_3 : \text{speed} \in [0.9, 1.2) \\
e_4 : \text{speed} \in [1.2, 1.5) & \quad e_5 : \text{speed} \in [1.5, 1.8) & \quad e_6 : \text{speed} \in [1.8, 2.1)
\end{aligned}$$

▼ Source Code

```

digraph {
  rankdir=LR
  fake [style=invisible]
  0 [root=true shape=doublecircle]
  1
  2
  3
  4
}

```

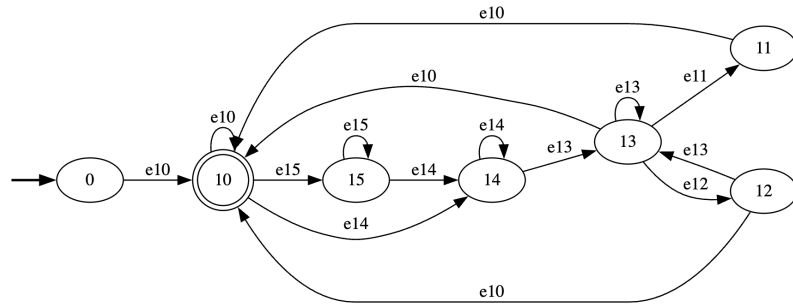
```

5
6
fake -> 0 [style=bold]
4 -> 3 [label=e3]
0 -> 0 [label=e0]
0 -> 5 [label=e5]
0 -> 1 [label=e1]
2 -> 2 [label=e2]
1 -> 1 [label=e1]
6 -> 6 [label=e6]
2 -> 0 [label=e0]
2 -> 1 [label=e1]
1 -> 0 [label=e0]
5 -> 3 [label=e3]
5 -> 6 [label=e6]
0 -> 6 [label=e6]
6 -> 5 [label=e5]
6 -> 4 [label=e4]
3 -> 2 [label=e2]
4 -> 2 [label=e2]
3 -> 1 [label=e1]
6 -> 3 [label=e3]
}

```

Driver Side Reverse Steering

7 states, 15 edges



▼ Edge Abstraction: $e_i : \text{steering} \in [(i - 10) \cdot 96, (i - 9) \cdot 96]$

$e_{10} : \text{steering} \in [0, 96]$ $e_{11} : \text{steering} \in [96, 192]$ $e_{12} : \text{steering} \in [192, 288]$
 $e_{13} : \text{steering} \in [288, 384]$ $e_{14} : \text{steering} \in [384, 480]$ $e_{15} : \text{steering} \in [480, 576]$

▼ Source Code

```

digraph {
    rankdir=LR
    fake [style=invisible]
    0 [root=true]
    10 [shape=doublecircle]
    11
    12
    13
    14
    15
    fake -> 0 [style=bold]
    10 -> 14 [label=e14]
    12 -> 13 [label=e13]
    13 -> 13 [label=e13]
    13 -> 11 [label=e11]
    11 -> 10 [label=e10]
    14 -> 14 [label=e14]
    15 -> 14 [label=e14]
    13 -> 12 [label=e12]
    10 -> 15 [label=e15]
}

```

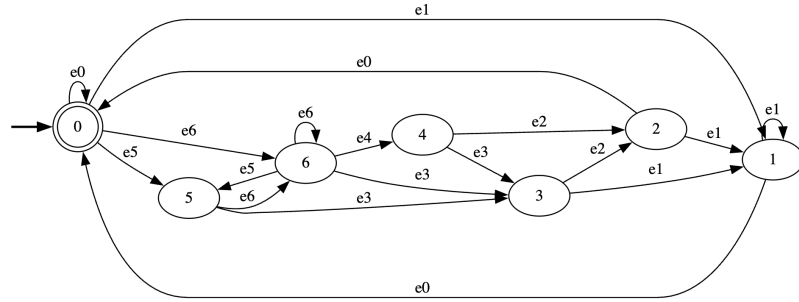
```

0 -> 10 [label=e10]
12 -> 10 [label=e10]
13 -> 10 [label=e10]
14 -> 13 [label=e13]
10 -> 10 [label=e10]
15 -> 15 [label=e15]
}

```

Passenger Side Reverse Speed

7 states, 18 edges



▼ Edge Abstraction: $e_i : \text{speed} \in [i \cdot 0.3, (i + 1) \cdot 0.3]$

$e_0 : \text{speed} \in [0, 0.3]$
 $e_1 : \text{speed} \in [0.3, 0.6]$
 $e_2 : \text{speed} \in [0.6, 0.9]$
 $e_3 : \text{speed} \in [0.9, 1.2]$
 $e_4 : \text{speed} \in [1.2, 1.5]$
 $e_5 : \text{speed} \in [1.5, 1.8]$
 $e_6 : \text{speed} \in [1.8, 2.1]$

▼ Source Code

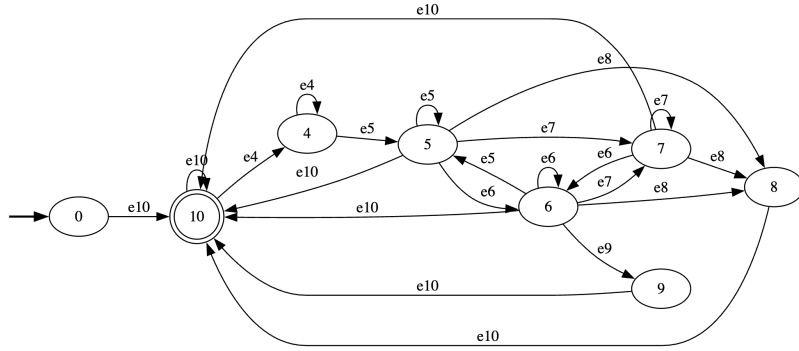
```

digraph {
    rankdir=LR
    fake [style=invisible]
    0 [root=true shape=doublecircle]
    1
    2
    3
    4
    5
    6
    fake -> 0 [style=bold]
    0 -> 5 [label=e5]
    6 -> 3 [label=e3]
    0 -> 0 [label=e0]
    2 -> 1 [label=e1]
    4 -> 2 [label=e2]
    0 -> 6 [label=e6]
    1 -> 0 [label=e0]
    5 -> 3 [label=e3]
    6 -> 6 [label=e6]
    6 -> 5 [label=e5]
    6 -> 4 [label=e4]
    3 -> 1 [label=e1]
    4 -> 3 [label=e3]
    3 -> 2 [label=e2]
    5 -> 6 [label=e6]
    1 -> 1 [label=e1]
    0 -> 1 [label=e1]
    2 -> 0 [label=e0]
}

```

Passenger Side Reverse Steering

8 states, 22 edges



▼ Edge Abstraction: $e_i : \text{steering} \in [(i - 10) \cdot 96, (i - 9) \cdot 96]$

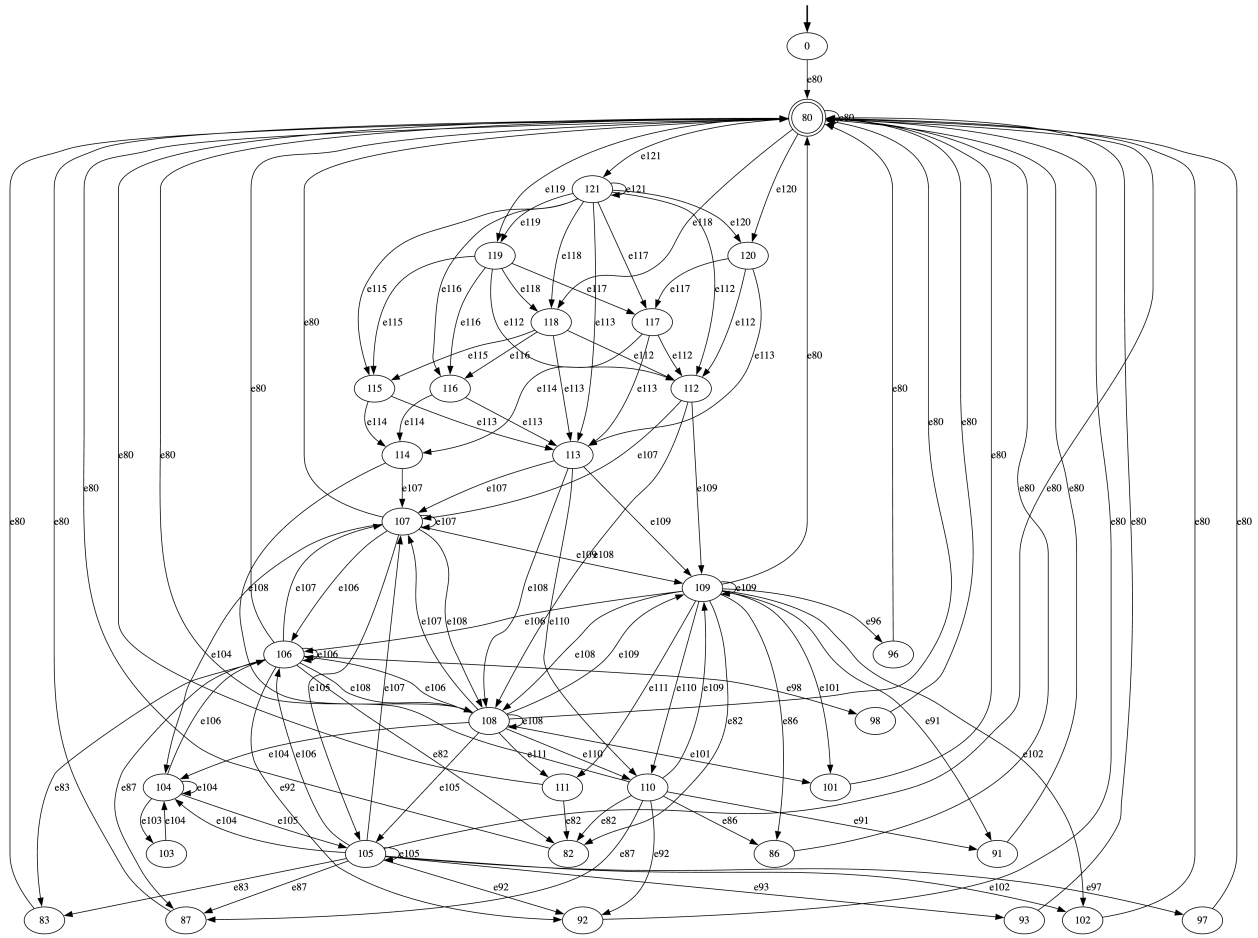
$e_4 : \text{steering} \in [-576, -480]$ $e_5 : \text{steering} \in [-480, -384]$ $e_6 : \text{steering} \in [-384, -288]$ $e_7 : \text{steering} \in [-288, -192]$
 $e_8 : \text{steering} \in [-192, -96]$ $e_9 : \text{steering} \in [-96, 0]$ $e_{10} : \text{steering} \in [0, 96]$

▼ Source Code

```
digraph {
  rankdir=LR
  fake [style=invisible]
  0 [root=true]
  4
  5
  6
  7
  8
  9
  10 [shape=doublecircle]
  fake -> 0 [style=bold]
  0 -> 10 [label=e10]
  6 -> 9 [label=e9]
  6 -> 5 [label=e5]
  8 -> 10 [label=e10]
  6 -> 6 [label=e6]
  7 -> 6 [label=e6]
  4 -> 4 [label=e4]
  9 -> 10 [label=e10]
  5 -> 8 [label=e8]
  10 -> 10 [label=e10]
  4 -> 5 [label=e5]
  6 -> 10 [label=e10]
  6 -> 7 [label=e7]
  5 -> 5 [label=e5]
  7 -> 7 [label=e7]
  7 -> 10 [label=e10]
  5 -> 6 [label=e6]
  10 -> 4 [label=e4]
  5 -> 7 [label=e7]
  7 -> 8 [label=e8]
  5 -> 10 [label=e10]
  6 -> 8 [label=e8]
}
```

Driver Side Reverse Steering (Fine Abstraction)

33 states, 118 edges



▼ Edge Abstraction: $e_i : \text{steering} \in [(i - 80) \cdot 12, (i - 79) \cdot 12]$

$e_0 \in [-960, -948)$	$e_1 \in [-948, -936)$	$e_2 \in [-936, -924)$	$e_3 \in [-924, -912)$	$e_4 \in [-912, -900)$
$e_5 \in [-900, -888)$	$e_6 \in [-888, -876)$	$e_7 \in [-876, -864)$	$e_8 \in [-864, -852)$	$e_9 \in [-852, -840)$
$e_{10} \in [-840, -828)$	$e_{11} \in [-828, -816)$	$e_{12} \in [-816, -804)$	$e_{13} \in [-804, -792)$	$e_{14} \in [-792, -780)$
$e_{15} \in [-780, -768)$	$e_{16} \in [-768, -756)$	$e_{17} \in [-756, -744)$	$e_{18} \in [-744, -732)$	$e_{19} \in [-732, -720)$
$e_{20} \in [-720, -708)$	$e_{21} \in [-708, -696)$	$e_{22} \in [-696, -684)$	$e_{23} \in [-684, -672)$	$e_{24} \in [-672, -660)$
$e_{25} \in [-660, -648)$	$e_{26} \in [-648, -636)$	$e_{27} \in [-636, -624)$	$e_{28} \in [-624, -612)$	$e_{29} \in [-612, -600)$
$e_{30} \in [-600, -588)$	$e_{31} \in [-588, -576)$	$e_{32} \in [-576, -564)$	$e_{33} \in [-564, -552)$	$e_{34} \in [-552, -540)$
$e_{35} \in [-540, -528)$	$e_{36} \in [-528, -516)$	$e_{37} \in [-516, -504)$	$e_{38} \in [-504, -492)$	$e_{39} \in [-492, -480)$
$e_{40} \in [-480, -468)$	$e_{41} \in [-468, -456)$	$e_{42} \in [-456, -444)$	$e_{43} \in [-444, -432)$	$e_{44} \in [-432, -420)$
$e_{45} \in [-420, -408)$	$e_{46} \in [-408, -396)$	$e_{47} \in [-396, -384)$	$e_{48} \in [-384, -372)$	$e_{49} \in [-372, -360)$
$e_{50} \in [-360, -348)$	$e_{51} \in [-348, -336)$	$e_{52} \in [-336, -324)$	$e_{53} \in [-324, -312)$	$e_{54} \in [-312, -300)$
$e_{55} \in [-300, -288)$	$e_{56} \in [-288, -276)$	$e_{57} \in [-276, -264)$	$e_{58} \in [-264, -252)$	$e_{59} \in [-252, -240)$
$e_{60} \in [-240, -228)$	$e_{61} \in [-228, -216)$	$e_{62} \in [-216, -204)$	$e_{63} \in [-204, -192)$	$e_{64} \in [-192, -180)$
$e_{65} \in [-180, -168)$	$e_{66} \in [-168, -156)$	$e_{67} \in [-156, -144)$	$e_{68} \in [-144, -132)$	$e_{69} \in [-132, -120)$
$e_{70} \in [-120, -108)$	$e_{71} \in [-108, -96)$	$e_{72} \in [-96, -84)$	$e_{73} \in [-84, -72)$	$e_{74} \in [-72, -60)$
$e_{75} \in [-60, -48)$	$e_{76} \in [-48, -36)$	$e_{77} \in [-36, -24)$	$e_{78} \in [-24, -12)$	$e_{79} \in [-12, 0)$
$e_{80} \in [0, 12)$	$e_{81} \in [12, 24)$	$e_{82} \in [24, 36)$	$e_{83} \in [36, 48)$	$e_{84} \in [48, 60)$
$e_{85} \in [60, 72)$	$e_{86} \in [72, 84)$	$e_{87} \in [84, 96)$	$e_{88} \in [96, 108)$	$e_{89} \in [108, 120)$
$e_{90} \in [120, 132)$	$e_{91} \in [132, 144)$	$e_{92} \in [144, 156)$	$e_{93} \in [156, 168)$	$e_{94} \in [168, 180)$
$e_{95} \in [180, 192)$	$e_{96} \in [192, 204)$	$e_{97} \in [204, 216)$	$e_{98} \in [216, 228)$	$e_{99} \in [228, 240)$
$e_{100} \in [240, 252)$	$e_{101} \in [252, 264)$	$e_{102} \in [264, 276)$	$e_{103} \in [276, 288)$	$e_{104} \in [288, 300)$
$e_{105} \in [300, 312)$	$e_{106} \in [312, 324)$	$e_{107} \in [324, 336)$	$e_{108} \in [336, 348)$	$e_{109} \in [348, 360)$
$e_{110} \in [360, 372)$	$e_{111} \in [372, 384)$	$e_{112} \in [384, 396)$	$e_{113} \in [396, 408)$	$e_{114} \in [408, 420)$
$e_{115} \in [420, 432)$	$e_{116} \in [432, 444)$	$e_{117} \in [444, 456)$	$e_{118} \in [456, 468)$	$e_{119} \in [468, 480)$
$e_{120} \in [480, 492)$	$e_{121} \in [492, 504)$	$e_{122} \in [504, 516)$	$e_{123} \in [516, 528)$	$e_{124} \in [528, 540)$
$e_{125} \in [540, 552)$	$e_{126} \in [552, 564)$	$e_{127} \in [564, 576)$	$e_{128} \in [576, 588)$	$e_{129} \in [588, 600)$
$e_{130} \in [600, 612)$	$e_{131} \in [612, 624)$	$e_{132} \in [624, 636)$	$e_{133} \in [636, 648)$	$e_{134} \in [648, 660)$
$e_{135} \in [660, 672)$	$e_{136} \in [672, 684)$	$e_{137} \in [684, 696)$	$e_{138} \in [696, 708)$	$e_{139} \in [708, 720)$
$e_{140} \in [720, 732)$	$e_{141} \in [732, 744)$	$e_{142} \in [744, 756)$	$e_{143} \in [756, 768)$	$e_{144} \in [768, 780)$
$e_{145} \in [780, 792)$	$e_{146} \in [792, 804)$	$e_{147} \in [804, 816)$	$e_{148} \in [816, 828)$	$e_{149} \in [828, 840)$
$e_{150} \in [840, 852)$	$e_{151} \in [852, 864)$	$e_{152} \in [864, 876)$	$e_{153} \in [876, 888)$	$e_{154} \in [888, 900)$
$e_{155} \in [900, 912)$	$e_{156} \in [912, 924)$	$e_{157} \in [924, 936)$	$e_{158} \in [936, 948)$	$e_{159} \in [948, 960)$

▼ Source Code

```

digraph {
    fake [style=invisible]
    0 [root=true]
    80 [shape=doublecircle]
    82
    83
    86
    87
    91
    92
    93
    96
    97
    98
    101
    102
    103
    104
    105
    106
    107
    108
    109
    110
    111
    112
    113
    114
    115
    116
    117
    118
    119
    120
    121
    fake -> 0 [style=bold]
    108 -> 104 [label=e104]

```

109 -> 106 [label=e106]
113 -> 108 [label=e108]
119 -> 115 [label=e115]
80 -> 118 [label=e118]
112 -> 108 [label=e108]
109 -> 91 [label=e91]
105 -> 97 [label=e97]
106 -> 82 [label=e82]
107 -> 107 [label=e107]
103 -> 104 [label=e104]
102 -> 80 [label=e80]
109 -> 102 [label=e102]
0 -> 80 [label=e80]
86 -> 80 [label=e80]
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121 -> 118 [label=e118]
87 -> 80 [label=e80]
116 -> 113 [label=e113]
106 -> 98 [label=e98]
118 -> 115 [label=e115]
105 -> 87 [label=e87]
109 -> 82 [label=e82]
105 -> 83 [label=e83]
112 -> 109 [label=e109]
119 -> 118 [label=e118]
105 -> 105 [label=e105]
108 -> 80 [label=e80]
121 -> 115 [label=e115]
110 -> 109 [label=e109]
93 -> 80 [label=e80]
117 -> 113 [label=e113]
118 -> 116 [label=e116]
104 -> 105 [label=e105]
80 -> 120 [label=e120]
106 -> 92 [label=e92]
121 -> 116 [label=e116]
114 -> 108 [label=e108]
96 -> 80 [label=e80]
109 -> 80 [label=e80]
110 -> 86 [label=e86]
116 -> 114 [label=e114]
104 -> 106 [label=e106]
117 -> 112 [label=e112]
113 -> 107 [label=e107]
112 -> 107 [label=e107]
80 -> 121 [label=e121]
107 -> 80 [label=e80]
119 -> 116 [label=e116]
108 -> 105 [label=e105]
121 -> 121 [label=e121]
106 -> 87 [label=e87]
105 -> 107 [label=e107]
107 -> 104 [label=e104]
106 -> 80 [label=e80]
104 -> 104 [label=e104]
106 -> 83 [label=e83]
109 -> 108 [label=e108]
120 -> 113 [label=e113]
121 -> 112 [label=e112]
108 -> 109 [label=e109]
105 -> 93 [label=e93]
98 -> 80 [label=e80]
109 -> 110 [label=e110]
106 -> 107 [label=e107]
101 -> 80 [label=e80]
110 -> 92 [label=e92]
83 -> 80 [label=e80]
118 -> 113 [label=e113]
119 -> 112 [label=e112]
105 -> 92 [label=e92]
109 -> 96 [label=e96]
108 -> 108 [label=e108]

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80 -> 119 [label=e119]
107 -> 108 [label=e108]
115 -> 114 [label=e114]
120 -> 112 [label=e112]
111 -> 82 [label=e82]
97 -> 80 [label=e80]
107 -> 105 [label=e105]
108 -> 110 [label=e110]
121 -> 113 [label=e113]
121 -> 119 [label=e119]
109 -> 109 [label=e109]
92 -> 80 [label=e80]
106 -> 108 [label=e108]
82 -> 80 [label=e80]
108 -> 107 [label=e107]
118 -> 112 [label=e112]
109 -> 111 [label=e111]
107 -> 106 [label=e106]
109 -> 101 [label=e101]
117 -> 114 [label=e114]
104 -> 103 [label=e103]
105 -> 106 [label=e106]
121 -> 120 [label=e120]
107 -> 109 [label=e109]
80 -> 80 [label=e80]
108 -> 111 [label=e111]
108 -> 106 [label=e106]
109 -> 86 [label=e86]
110 -> 80 [label=e80]
121 -> 117 [label=e117]
105 -> 102 [label=e102]
105 -> 80 [label=e80]
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111 -> 80 [label=e80]
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106 -> 106 [label=e106]
108 -> 101 [label=e101]
115 -> 113 [label=e113]
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113 -> 109 [label=e109]
119 -> 117 [label=e117]
114 -> 107 [label=e107]
120 -> 117 [label=e117]
91 -> 80 [label=e80]
105 -> 104 [label=e104]
}
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