

# CSP Solver

...

# SEND + MONEY

Buscar distintos digitos para las letras S,E,N,D,M,O,R,Y de modo que  $SEND + MORE = MONEY$  siga siendo válido

# N QUEENS

```
for (int i = 0; i<n; i++)  
    for (int j = i+1; j<n; j++) {  
        rel(*this, q[i] != q[j]);  
        rel(*this, q[i]+i != q[j]+j);  
        rel(*this, q[i]-i != q[j]-j);  
    }
```

```
distinct(*this, IntArgs::create(n,0,1), q, opt.icl());  
distinct(*this, IntArgs::create(n,0,-1), q, opt.icl());  
distinct(*this, q, opt.icl());
```

```
for (int i = 0; i<n; i++)  
    for (int j = i+1; j<n; j++) {  
        rel(*this, q[i]+i != q[j]+j);  
        rel(*this, q[i]-i != q[j]-j);  
    }  
distinct(*this, q, opt.icl());
```

# N QUEENS

| Soluciones |          |         |         |
|------------|----------|---------|---------|
| n          | Distinct | Binary  | Mixed   |
| 4          | 2        | 2       | 2       |
| 5          | 10       | 10      | 10      |
| 6          | 4        | 4       | 4       |
| 7          | 40       | 40      | 40      |
| 8          | 92       | 92      | 92      |
| 9          | 35       | 352     | 352     |
| 10         | 724      | 724     | 724     |
| 11         | 2,680    | 2,680   | 2,680   |
| 12         | 14,200   | 14,200  | 14,200  |
| 13         | 73,712   | 73,712  | 73,712  |
| 14         | 365,596  | 365,596 | 365,596 |
| 15         | 2279184  | 2279184 | 2279184 |

# N QUEENS

| Tiempo [ms] |             |             |             |
|-------------|-------------|-------------|-------------|
| n           | Distinct    | Binary      | Mixed       |
| 4           | 0.199       | 0.421       | 0.256       |
| 5           | 0.317       | 0.394       | 0.274       |
| 6           | 0.355       | 0.370       | 0.377       |
| 7           | 1,000.320   | 0.940       | 0.960       |
| 8           | 3.586       | 2.583       | 3.726       |
| 9           | 10.439      | 15.488      | 10.575      |
| 10          | 26.080      | 36.278      | 39.758      |
| 11          | 275.659     | 278.617     | 284.941     |
| 12          | 1,725.037   | 1,733.941   | 1,771.761   |
| 13          | 9,865.546   | 9,854.946   | 9,874.851   |
| 14          | 52,294.313  | 52,341.391  | 52,185.190  |
| 15          | 346,428.218 | 349,449.975 | 348,188.092 |

# N QUEENS

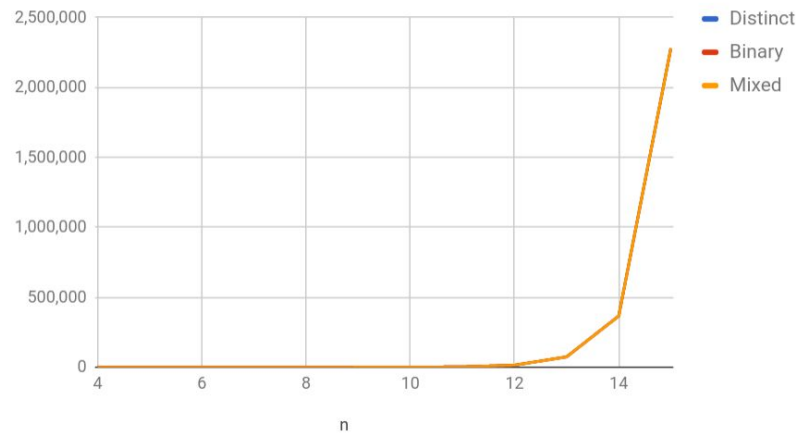
| Propagadores |          |        |       |
|--------------|----------|--------|-------|
| n            | Distinct | Binary | Mixed |
| 4            | 3        | 18     | 18    |
| 5            | 3        | 30     | 30    |
| 6            | 3        | 45     | 45    |
| 7            | 3        | 63     | 63    |
| 8            | 3        | 84     | 84    |
| 9            | 3        | 108    | 108   |
| 10           | 3        | 135    | 135   |
| 11           | 3        | 165    | 165   |
| 12           | 3        | 198    | 198   |
| 13           | 3        | 234    | 234   |
| 14           | 3        | 273    | 273   |
| 15           | 3        | 315    | 315   |

# N QUEENS

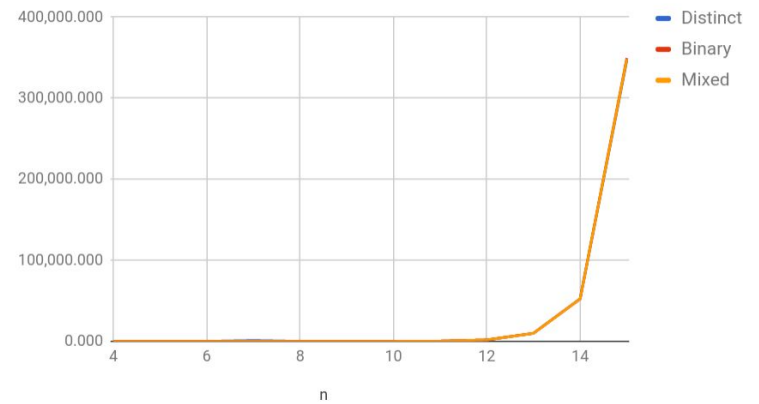
| Propagaciones |          |           |           |
|---------------|----------|-----------|-----------|
| n             | Distinct | Binary    | Mixed     |
| 4             | 29       | 89        | 64        |
| 5             | 102      | 368       | 270       |
| 6             | 271      | 1120      | 864       |
| 7             | 839      | 3962      | 2973      |
| 8             | 3034     | 15911     | 11709     |
| 9             | 11827    | 65835     | 48195     |
| 10            | 45027    | 269908    | 198631    |
| 11            | 195128   | 1231873   | 902322    |
| 12            | 931501   | 6148025   | 4486297   |
| 13            | 4761432  | 32730208  | 23785047  |
| 14            | 25951470 | 184917521 | 134006062 |
| 15            |          |           |           |

# N QUEENS

Distinct, Binary and Mixed

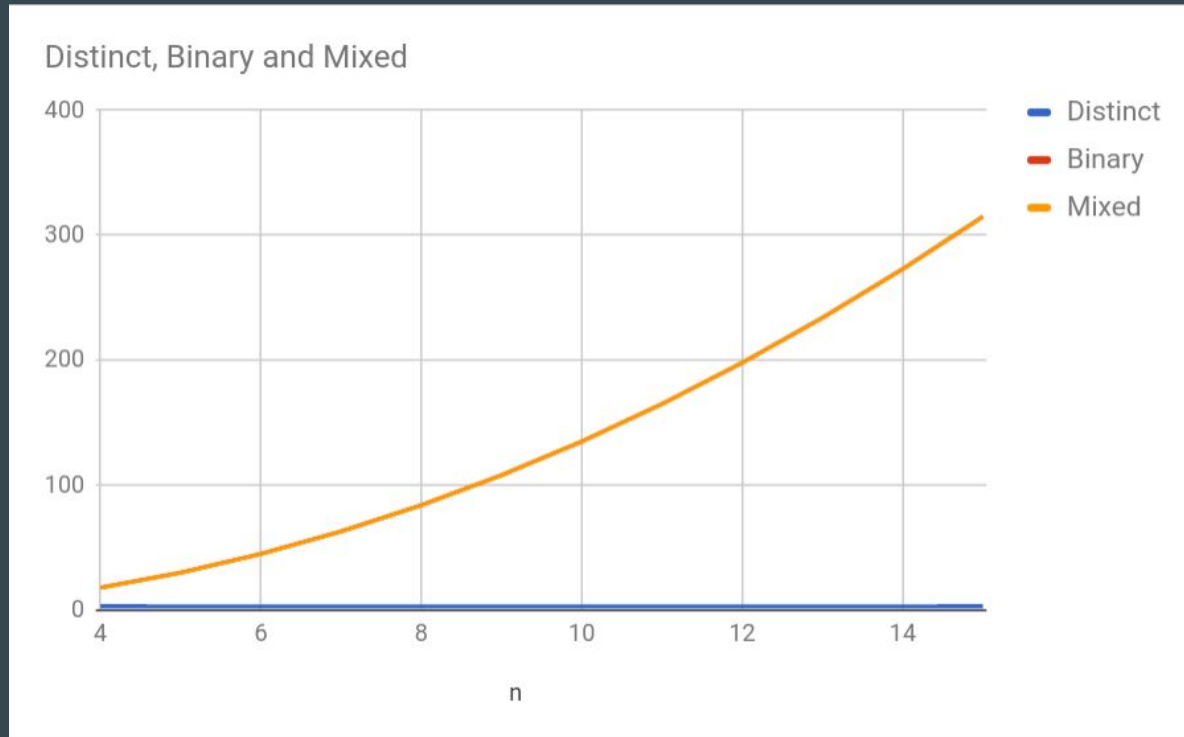


Distinct, Binary and Mixed





# N QUEENS



# N QUEENS

