

Day 9 - Elven marbles

Init

```
In[1]:= SetDirectory[NotebookDirectory[]];
```

```
In[2]:= (in = ReadList["input.txt", String])
```

```
Out[2]:= {459 players; last marble is worth 72103 points}
```

10 players; last marble is worth 1618 points: high score is 8317

13 players; last marble is worth 7999 points: high score is 146373

17 players; last marble is worth 1104 points: high score is 2764

21 players; last marble is worth 6111 points: high score is 54718

30 players; last marble is worth 5807 points: high score is 37305

```
In[3]:= Clear[place]
```

```
In[13]:= ? place
```

Global`place

```
place[round_, {list_, idx_, value_}] := Module[{n, after, val}, n = Length[list];  
  after = Mod[idx, n] + 1;  
  val = list[[idx]] + 1;  
  If[after == n, {Append[list, round], n + 1, val},  
    {Insert[list, round, after + 1], after + 1, val}]]
```

```
In[4]:= place[round_, {list_, idx_, value_}] := Module[{n, after, val},  
  n = Length[list];  
  (* Mathematica is index-1 based which kind of sucks for this *)  
  after = Mod[idx, n] + 1;  
  val = list[[idx]] + 1;  
  If[after == n,  
    {Append[list, round], n + 1, val},  
    {Insert[list, round, after + 1], after + 1, val}  
  ]  
]
```

```
In[5]:= remove[{list_, idx_, value_}] := Module[{n, loc, val, newIdx, newList},
  n = Length[list];
  loc = Mod[idx - 8, n] + 1;
  val = list[[loc]];
  newIdx = If[loc == Length[list], 1, loc];
  newList = Delete[list, loc];
  {newList, newIdx, val}
]
```

```
In[22]:= play[players_, marbles_] := Module[{state = {{0}, 1, 0}, player, score},
  score = <|# → 0 & /@ Range[1, players]|>;
  Do[
    player = Mod[k - 1, players] + 1;
    If[Mod[k, 23] == 0,
      (* points awarded *)
      score[player] += k;
      state = remove[state];
      score[player] += state[[-1]],
      (* add marble *)
      state = place[k, state]
    ],
    (*Print["player=", player, ", k=", k, ", state=", state], *)
    {k, marbles}
  ];
  Max[score]
]
```

```
In[23]:= play[10, 1618]
```

```
Out[23]= 8317
```

```
In[24]:= play[13, 7999]
```

```
Out[24]= 146 373
```

```
In[25]:= play[30, 5807]
```

```
Out[25]= 37 305
```

```
In[27]:= Timing[play[459, 72 103]]
```

```
Out[27]= {9.42428, 388 131}
```

```
In[29]:= Timing[play[459, 721 030]]
```

```
Out[29]= {2438.83, 33 022 481}
```