Day 4 - Guards asleep

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

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

The data comes unsorted so take care of that first

In[3]:=
```
(sorted = Sort[in]) ~Take~ 10 // TableForm
```

Out[3]//TableForm=
```
[1518-03-01 23:58] Guard #179 begins shift
[1518-03-02 00:27] falls asleep
[1518-03-02 00:32] wakes up
[1518-03-03 00:00] Guard #2269 begins shift
[1518-03-03 00:23] falls asleep
[1518-03-03 00:24] wakes up
[1518-03-03 23:56] Guard #1061 begins shift
[1518-03-04 00:15] falls asleep
[1518-03-04 00:54] wakes up
[1518-03-04 23:58] Guard #683 begins shift
```

In[4]:=
```
parseLine[s_] := Module[{brack, date, values},
  brack = StringSplit[s, {"[", "]"}];
  values = StringSplit[brack[[2]], " "];
  Join[{DateObject[brack[[1]]]}, values]
 ]
```

In[5]:=
```
data = parseLine /@ sorted;
```

In[6]:=
```
data[[1]]
```

Out[6]=
```
{Minute: Fri 1 Mar 1518 23:58 GMT−6., Guard, #179, begins, shift}
```

In[7]:=
```
DateValue[data[[1, 1]], "Minute"]
```

Out[7]=
```
58
```

In[8]:=
```
Clear[guard]
```

In[9]:=
```
guard[_, _] = 0;
```

Parse sorted lines and make a list of all guards

In[10]:=
```
glist = Module[{idx, falls, wakes, guardList = {}},
 Do[
  Switch[e[[2]],
   "Guard", idx = e[[3]]; AppendTo[guardList, idx],
   "falls", falls = e[[1]],
   "wakes", wakes = e[[1]]; Do[guard[idx, i] += 1,
    {i, DateValue[falls, "Minute"], DateValue[wakes, "Minute"] - 1}],
   _, Print["unexpected line: ", e]
  ], {e, data}
 ];
 Union[guardList]
]
```

Out[10]=
```
{⌗1009, ⌗1061, ⌗109, ⌗1163, ⌗1187, ⌗1229, ⌗1381, ⌗1667, ⌗1777, ⌗179, ⌗1913,
 ⌗2269, ⌗2521, ⌗2539, ⌗277, ⌗3083, ⌗3167, ⌗3331, ⌗421, ⌗509, ⌗683, ⌗701, ⌗863}
```

Calculate which guard has the most minutes overall

```
findMax = Module[{sum, maxMinutes = 0, gid},
 Do[
  sum = Sum[guard[g, m], {m, 0, 59}];
  If[sum > maxMinutes, maxMinutes = sum; gid = g],
  {g, glist}
 ];
 {maxMinutes, gid}
]
```

Out[11]=
```
{463, ⌗3167}
```

Find which minute he is most frequently asleep

In[12]:=
```
findMinute[g_] := Module[{max = 0, minute},
  Do[If[guard[g, m] > max, max = guard[g, m]; minute = m],
   {m, 0, 59}
  ];
  {max, minute}
 ]
```

In[13]:=
```
findMinute[findMax[[2]]]
```

Out[13]=
```
{13, 45}
```

In[14]:=
```
Table[guard[findMax[[2]], m], {m, 0, 59}]
```

Out[14]=
```
{2, 2, 2, 2, 2, 2, 3, 3, 4, 3, 4, 4, 4, 5, 6, 7, 8, 8, 9, 9, 9,
 11, 10, 11, 11, 12, 11, 11, 11, 11, 11, 11, 11, 10, 11, 10, 11, 11, 11,
 11, 11, 11, 10, 10, 12, 13, 12, 11, 11, 11, 9, 8, 7, 8, 5, 4, 2, 2, 1, 0}
```

Answer to first question

In[15]:=
```
3167 * 45
```

Out[15]=
```
142 515
```

Find the most likely minute of any guard

In[16]:=
```
findGlobalMinute = Module[{max = 0, pos},
  Do[
   If[guard[g, m] > max, max = guard[g, m]; pos = {g, m}],
   {g, glist}, {m, 0, 59}
  ];
  {max, pos}
 ]
```

Out[16]=
```
{18, {⌗179, 30}}
```

In[17]:=
```
179 * 30
```

Out[17]=
```
5370
```