I2300 Algoritmiek
Homework Exercise 2a

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Legal

I have discussed the excercises with Jelle Licht and Felix Akkerman.

1

The optimal solution for this particular problem is contestant 2 and then contestant 1, this gives a total time of $4 + 6 + 3 + 2 = 15$.

2

Asuming there are one or more weights and none of the weights exceed the maximum a truck can handle.

```
running times r_i, ..., r_n;
biking times b_i, ..., b_n;
swimming times w_i, ..., w_n;
C;                              /* a list of contestant numbers from 1 to n */
S;                                  /* a list of contestant starting times */
Sort C by r_i + b_i ≤ r_{i+1} + b_{i+1};
S_0 = 0;
S_1 = w_{C_1};
foreach C as i do              /* i becomes the number of the current contestant */
    S_i ← S_{i-1} + w_{C_i};    /* set current contestants' start time to the last start
    time + his swim time */
end
```

Algorithm 1: Calculate number of trucks required

3

The main loop of the algorithm is $O(n)$ but the sorting is $O(n \log n)$. The sorting outweighs $O(n)$ so the algorithm has a tightest worst-case upper bound of $O(n \log n)$.

4

Too tired...