

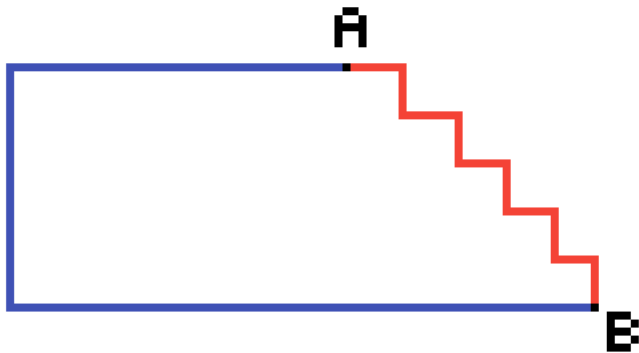
Exercises 1-6.

Ex 1.1 Let $a = b = -1$, then $a + b = -2 < -1 = \min(a, b)$.

Ex 1.2 Let $a = -1$ and $b = 2$, then $a \cdot b = -2 < -1 = \min(a, b)$.

Ex 1.3 Suppose there are only two routes between a and b , named x and y . The route x is 20 km, but the speed limit is 100 km/hr throughout. y on the other hand is 18 km, but the speed limit is 1 km/hr throughout. Thus y is the shorter route, but x is faster.

Ex 1.4



The red route has 9 turns while blue has 2 turns, yet the red route is clearly shorter.

Ex 1.5 a)

Consider $S = \{1, 2\}$ and $T = 2$. The first-fit algorithm would pick 1 and ignore 2. A correct solution however would ignore 1 and take 2.

Ex 1.5 b)

Consider $S = \{1, 2\}$ and $T = 2$. The best-fit algorithm would pick 1 and ignore 2. A correct solution however would ignore 1 and take 2.

Ex 1.5 c)

Consider $S = \{4, 5, 8\}$ and $T = 9$. The largest-first algorithm would pick 8 and ignore the remaining elements. A correct solution however would take only 4 and 5, which sum up to T .

Ex 1.6

Consider $U = \{1, 2, 3, 4, 5, 6\}$, $S_1 = \{1, 2, 3, 4\}$, $S_2 = \{1, 2, 5\}$, and $S_3 = \{3, 4, 6\}$. The algorithm would first pick S_1 , followed by S_2 and S_3 in arbitrary order. Thus the algorithm would pick three sets. However $S_2 \cup S_3 = U$, thus there exists a solution with only two sets.