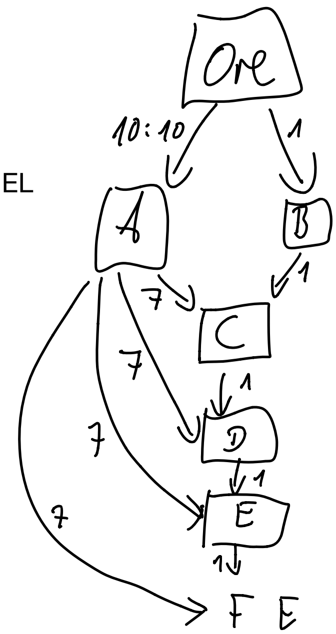
Each reaction gives specific quantities for its inputs and output; reactions cannot be partially run, so only whole integer multiples of these quantities can be used. (It's okay to have leftover chemicals when you're done, though.) For example, the reaction 1 A, 2 B, 3 C => 2 D means that exactly 2 units of chemical D can be produced by consuming exactly 1 A, 2 B and 3 C. You can run the full reaction as many times as necessary; for example, you could produce 10 D by consuming 5 A, 10 B, and 15 C.

Suppose your nanofactory produces the following list of reactions:

10 ORE => 10 A
1 ORE => 1 B
7 A, 1 B => 1 C
7 A, 1 C => 1 D
7 A, 1 D => 1 E
7 A, 1 E => 1 FUEL

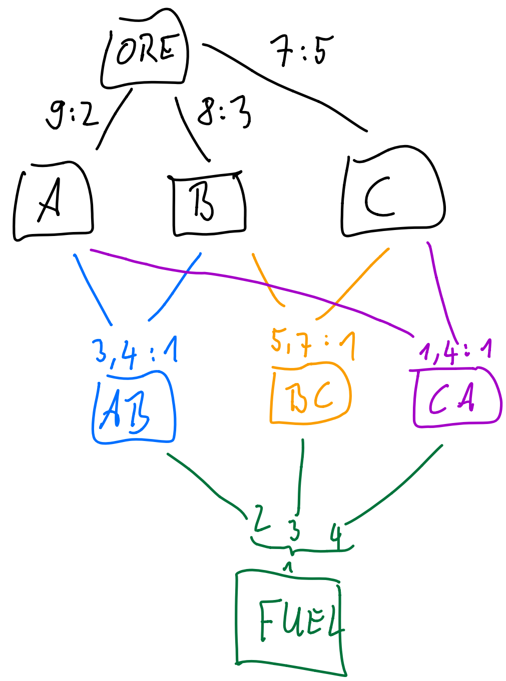


The first two reactions use only ORE as inputs; they indicate that you can produce as much of chemical A as you want (in increments of 10 units, each 10 costing 10 ORE) and as much of chemical B as you want (each costing 1 ORE). To produce 1 FUEL, a total of 31 ORE is required: 1 ORE to produce 1 B, then 30 more ORE to produce the 7 + 7 + 7 + 7 = 28 A (with 2 extra A wasted) required in the reactions to convert the B into C, C into D, D into E, and finally E into FUEL. (30 A is produced because its reaction requires that it is created in increments of 10.)

9 ORE => 2 A
8 ORE => 3 B
7 ORE => 5 C
3 A, 4 B => 1 AB
5 B, 7 C => 1 BC
4 C, 1 A => 1 CA
2 AB, 3 BC, 4 CA => 1 FUEL

The above list of reactions requires 165 ORE to produce 1 FUEL:

Consume 45 ORE to produce 10 A.
Consume 64 ORE to produce 24 B.
Consume 56 ORE to produce 40 C.
Consume 6 A, 8 B to produce 2 AB.
Consume 15 B, 21 C to produce 3 BC.
Consume 16 C, 4 A to produce 4 CA.
Consume 2 AB, 3 BC, 4 CA to produce 1 FUEL.



$$2\,AB = 2(3A + 4B) = 6A + 8B$$
$$3\,BC = 3(5B + 7C) = 15B + 21C$$
$$4\,CA = 4(4C + 1A) = 16C + 4A$$

$$10A = 10\left(\frac{9\,ORE}{2A}\right) = 5 \cdot 9\,ORE = 45\,ORE \text{ for } 10\,A$$
$$23\,B = 23\left(\frac{8\,ORE}{3B}\right) = \frac{23}{3} \Rightarrow \frac{24}{3} \cdot 8\,ORE = 64\,ORE \text{ for } 24\,B$$
$$37\,C = 37\left(\frac{7\,ORE}{5C}\right) = \frac{37}{5} \Rightarrow \frac{40}{5} \cdot 7\,ORE = 56\,ORE \text{ for } 40\,C$$

$$\frac{45 + 64 + 56 = 165\ ORE}{1\ FUEL}$$