Quiz

Under the Bitcoin protocol, a block can contain up to 1000000 bytes of transactions.
Miners can freely choose transactions to include in a block, and once they mine a block, they earn the transaction fees for each transaction in the block and an additional 12.5 BTC as a reward (as of May 2017).
Please find the maximum possible reward for creating a block using the following 12 transactions:

ID	Size (byte)	Fee (BTC)
1	57247	0.0887
2	98732	0.1856
3	134928	0.2307
4	77275	0.1522
5	29240	0.0532
6	15440	0.0250
7	70820	0.1409
8	139603	0.2541
9	63718	0.1147
10	143807	0.2660
11	190457	0.2933
12	40572	0.0686

Solution is 14.2593 BTC

Here explanation

As for the hint, the maximum size of the block was 500000 bytes, the total of transactions to get 13.4376BTC was 499032.

It corresponds of (13.4376 BTC - 12.5BTC) = 0.9376 BTC which corresponds of the sum of the fees of blocks 2 + 4 + 5 + 6 +7 + 9 + 10.

I made this small program in python to find the good combinaison

/// # Online Python compiler (interpreter) to run Python online.

import itertools

numbers = [1856, 686, 2933, 2660, 1147, 2541, 1409, 250, 532,1522,2307,887] target = 9376
result = [seq for i in

range(len(numbers), 0, -1)

for seq in itertools.combinations(numbers, i)

if sum(seq) == target] print(result)

///

Going back to original question with a maximum of 1000000 bytes for a bitcoin block and without repeating transaction.

Let's add all the transactions sizes and we get in total 1061839.

It corresponds to a total of 1.873 BTC in fees.

It means 61839 bytes must be removed but we must keep in mind the corresponding fee .

First let's check to remove only one transaction:

transaction 2 : total fees : 1.6844

Transaction 3 : 1.636

Transaction 4 : 1.7208

Transaction 7 : 1.7321

Transaction 8 : 1.6189

Transaction 9 : 1.7583

Transaction 10: 1.607

Transaction 11 : 1.5797

Let's try a couple of small transactions where the sum reaches 61839 bytes:

transactions 1 and 6 : 1.7593 BTC

that combinaison looks like the best one!

The maximum award is 1.7593 + 12.5 = 14.2593 BTC corresponding to transactions 2,3,4,5,7,8,9,10,11,12