Case Study#1

You have the following logistic network (see Figure 1). As a Supply Chain manager you know that you need to send your only truck available, from either the MN site or the MS site (but not from both), to the to the GN site or the GS site (but not to both). Also, you know that:

- Depending on where you initially send your only truck, the units of cargo in the truck is going to change (see Figure 1), i.e. 50 units of cargo can be sent from MN to HC, while100 units of cargo can be sent from MS to HC.
- When arriving to the HN, HC, HS sites, the truck can leave the 100% of its cargo units, or 50%, or a 0% , where the remaining units of cargo can be used later on the GN or GS sites, i.e. when sending the truck from MS to HC – with 100 units of cargo – if 50 units are left at this last site (so the Beginning Inventory or B_I at HC would be 50), the remaining units of cargo left in the truck, will be used on the next site (either GN or GS).
- Depending on the B_I at each site, an expected profit is expected (see Figure 1), i.e. a B_I of 100 units of cargo at the HN site, a profit of 18k is expected.
- There is a transportation cost between sites (see Figure 1).

Use a Linear Programing approach to establish the most profitable route.

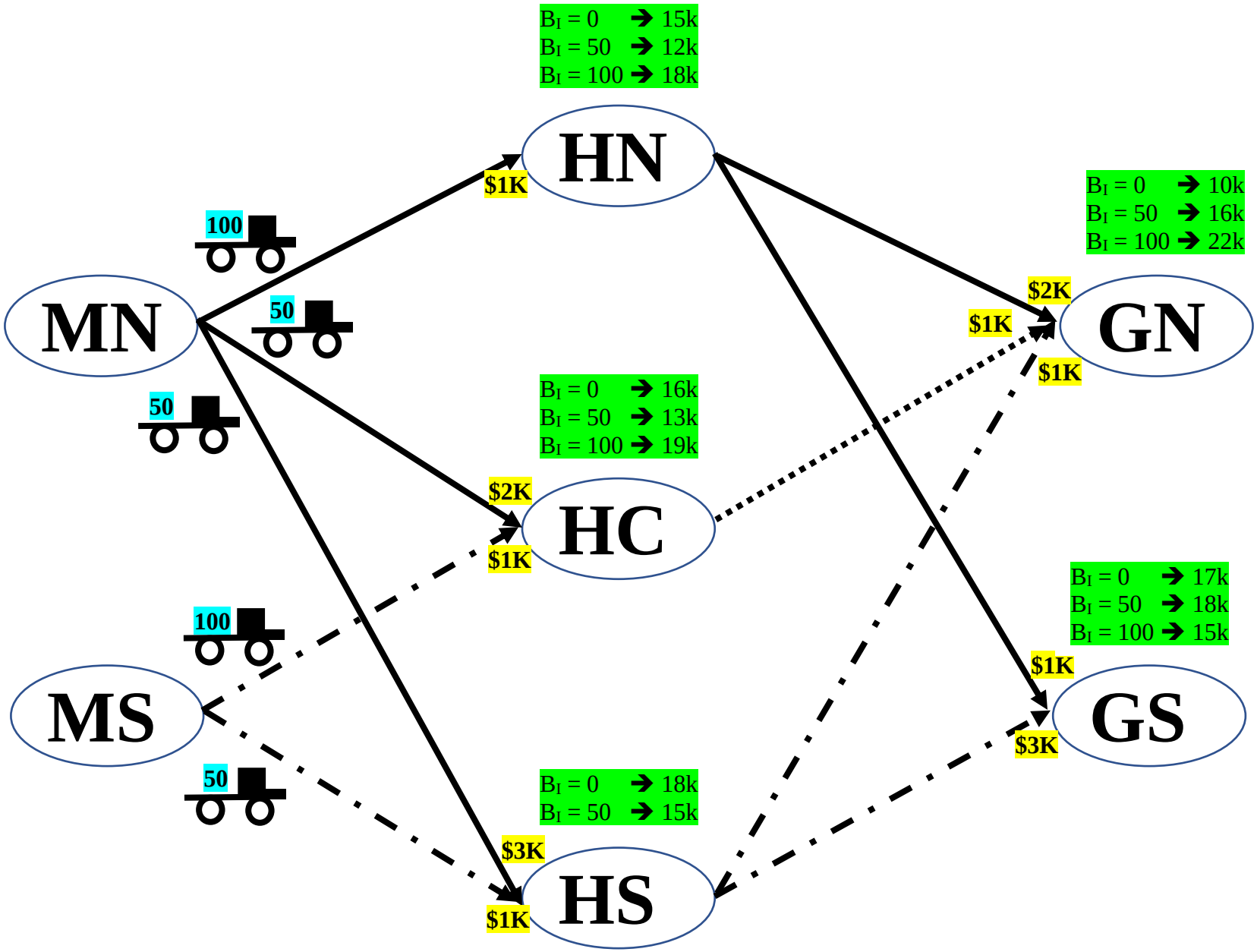
$B_I = 0$ ➔ 15k
$B_I = 50$ ➔ 12k
$B_I = 100$ ➔ 18k
HN
$1K
100
MN
50
50
$B_I = 0$ ➔ 10k
$B_I = 50$ ➔ 16k
$B_I = 100$ ➔ 22k
$2K
$1K
GN
$1K
$B_I = 0$ ➔ 16k
$B_I = 50$ ➔ 13k
$B_I = 100$ ➔ 19k
$2K
HC
$1K
$B_I = 0$ ➔ 17k
$B_I = 50$ ➔ 18k
$B_I = 100$ ➔ 15k
100
$1K
MS
GS
$3K
50
$B_I = 0$ ➔ 18k
$B_I = 50$ ➔ 15k
$3K
HS
$1K

Figure 1