Transshipment Problem - Site selection

4 costs we need to compute (minimize) here

1) Transportation cost from warehouse(s) to demand(s)
2) Transportation cost from supply(s) to warehouse(s)
3) Transportation cost from demand(s) to supply(s)
4) Cost of operation of the warehouse (s)

Warehouse   demand

$A: 4(W_A D_1) + 6(W_A P_2)$

$B: 3(W_B D_1) + 4(W_B D_2)$

$C: 5(W_C D_1) + 3(W_C D_2)$
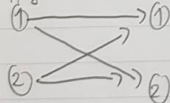
Supply   Warehouse

$1: 1(S_1 W_A) + 2(S_1 W_B) + 8(S_1 W_C)$

$2: 6(S_2 W_A) + 3(S_2 W_B) + 1(S_2 W_C)$

Supply   Demand

$1: 4(S_1 D_1) + 8(S_1 P_2)$

$2: 7(S_2 D_1) + 6(S_2 P_2)$

Warehouse operand: Constraint

A: 50

B: 60

C: 68

1) S_1 must not exceed 50
2) S_2 must not exceed 75
3) d_1 must exceed 75
4) d_2 must exceed 50
5) W_B must not exceed 60
6) W_C must not exceed 70

7) All warehouse can't send more than it receives.

Together, we get →

$\min \ W_A(50 + 1S_1 W_A + 6S_2 W_A + 4W_A d_1 + 6W_A d_2) +$
$\qquad W_B(60 + 2S_1 W_B + 3S_2 W_B + 3W_B d_1 + 4W_B d_2) +$
$\qquad W_C(68 + 8S_1 W_C + 1S_2 W_C + 5W_C d_1 + 3W_C d_2) +$
$\qquad 4S_1 d_1 + 8S_1 d_2 + 7S_2 d_1 + 6S_2 d_2$

such that

$\qquad W_A + W_B + W_C \leq 1 \quad$ where w_1, w_2, w_3 are binary

$S_1 W_A + S_1 W_B + S_1 W_C + S_1 d_1 + S_1 d_2 \leq 50$

$S_2 W_A + S_2 W_B + S_2 W_C + S_2 d_1 + S_2 d_2 \leq 75$

$W_A d_1 + W_B d_1 + W_C d_1 + S_1 d_1 + S_2 d_1 \geq 75$

$W_A d_2 + W_B d_2 + W_C d_2 + S_1 d_2 + S_2 d_2 \geq 50$

$S_1 W_A + S_2 W_A \leq 99999 \, W_A \quad \leftarrow$ no limit capacity

$S_1 W_B + S_2 W_B \leq 60 \, W_B$

$S_1 W_C + S_2 W_C \leq 70 \, W_C$

$W_A d_1 + W_A d_2 \leq S_1 W_A + S_2 W_A$

$W_B d_1 + W_B d_2 \leq S_1 W_B + S_2 W_B$

$W_C d_1 + W_C d_2 \leq S_1 W_C + S_2 W_C$