MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 1 - OCTOBER 2014 SOLUTION KEY

Team Round – continued

F) The following sequence shows how $(5,5,0)$ can be obtained,
starting with a first transfer to $(6,0,4)$.
$(6,0,4) \Rightarrow (6,4,0) \Rightarrow (2,4,4) \Rightarrow (2,7,1) \Rightarrow (9,0,1) \Rightarrow (9,1,0) \Rightarrow (5,1,4) \Rightarrow (5,5,0)$
This required 8 transfers.
Convince yourself that, starting with $(6,0,4)$, no shorter sequence is possible.
Starting with $(3,7,0)$ produces the following tree which <u>eventually</u> produces $(6,0,4)$, and, consequently, a longer sequence.

$(3,7,0)$

$(0,7,3)$ $(3,3,4)$

$(0,6,4)$ $(7,0,3)$ $(0,6,4)$ $(6,0,4)$

$(6,0,4)$ $(6,0,4)$ $(6,0,4)$

Thus, the minimum sequence is **<u>8</u>** transfers.