**Integer Programming.**

Due to the covid-19 epidemic in phoenix area, university health center hired 3 new volunteers to work with 3 virus testers. The health center director wants to get maximum working time of all the 6 workers in the 6-preparation practice collaboration that make sure they can deal with the trying time period. There is a total of 18 workers, including 3 volunteers. Health center split these 18 workers into 3 groups of 6 workers each and has also pre-planned the minutes of a test for every worker. The table below shows the pre-planned minutes of operation for 6 of the workers, including the 3 volunteers. The requirement around this group is that: either all workers take part in test, or all miss the same practice. If the 3 volunteers cannot take part in the test for more than 320 minutes in total across all of the 6 practices (each match is of 90minutes duration), what is the maximum minutes of practice that can be achieved out of this group of 6 workers?

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| --- | --- | --- | --- | --- | --- | --- |
| Practice | Worker 1 (volunteer) | Worker 2 (volunteer) | Worker 3 (volunteer) | Worker 4 | Worker 5 | Worker 6 |
| 1 | 45 | 77 | 63 | 75 | *81* | 85 |
| 2 | 81 | 45 | 70 | 68 | 88 | 90 |
| 3 | 45 | 78 | 81 | 82 | 90 | 90 |
| 4 | 81 | 87 | 90 | 90 | 90 | 90 |
| 5 | 90 | 90 | 88 | 90 | 77 | 60 |
| 6 | 90 | 81 | 45 | 70 | 90 | 88 |

**Discussion.**

This is an example of an integer programming model. The basic objective if simple, i.e. to maximize the minutes of practice for this group. We must decide which of the 6 matches will be taking part in by this group of workers that will help them get ready for the real case. In this case, we only need to decide which matches to select, i.e. a binary decision. The minutes of practice by each worker cannot be controlled by us and have been predefined in the question. We need to be varied of the constraint that the volunteers cannot play for more than 320 minutes in total across the matches chosen.