

סמסטר אביב תשע"ח
למידה משאלות השמה ובדיקות קבוצתיות

נושאים מתקדמים 236803 Group testing and Learning from Membership Queries

מרצה:	נאדר בשותי
דרישות קדם:	הסתברות + אלגברה מודרנית + קומבינטוריקה

תאור הקורס

Robert Dorfman's paper in 1943 introduced the field of (Combinatorial) Group Testing. The motivation arose during the Second World War when the United States Public Health Service and the Selective service embarked upon a large scale project. The objective was to weed out all syphilitic men called up for induction. However, syphilis testing back then was expensive and testing every soldier individually would have been very cost heavy and inefficient. A basic breakdown of a **test** is:

- Draw sample from a given individual
- Perform required tests
- Determine presence or absence of syphilis

Say we have n soldiers, then this method of testing leads to n tests. If we have 70-75% of the people infected, then the method of individual testing would be reasonable. Our goal however, is to achieve effective testing in the more likely scenario where it does not make sense to test 100,000 people to get (say) 10 positives.

The feasibility of a more effective testing scheme hinges on the following property. We can combine blood samples and test a combined sample together to check if at least one soldier has syphilis.

Books

Ding-Zhu Du, Frank K Hwang (2006). Pooling Designs and Nonadaptive Group Testing. Boston: Twayne Publishers.

Ding-Zhu Du, Frank K Hwang Combinatorial Group Testing and Its Applications. 2nd Edition

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