Mortimer and Raymond Sackler ●●●   המכון ללימודים מתקדמים   ●●●   אוניברסיטת
Institute of Advanced Studies   ע"ש מורטימר ורייימונד סאקלר   **TEL AVIV**   תל אביב
     UNIVERSITY

פרופסור ניל אימרמן
הקולג׳ למידע ולמדעי המחשב
אוניברסיטת מסצ׳וסטס, אמהרסט, ארה"ב

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Lecture | הרצאה

DESCRIPTIVE COMPLEXITY: USING LOGIC TO UNDERSTAND COMPUTATION

Abstract

Most computational problems can be understood as computing a function from n-bit inputs to m-bit outputs. The bits of the output are properties of the input. It is striking that the computational complexity of computing the function in terms of time, space, number of processors, etc., can be completely understood via the expressive power of the logical language needed to describe these properties. This will be an accessible talk explaining descriptive complexity and the resulting insights gained. I will end by describing some of the progress achieved by many researchers over the last 5 years.

The Lecture will be held on Sunday,   ההרצאה תתקיים ביום ראשון,
14 May 2017, at 11:10,   14 במאי 2017, בשעה 11:10,
Room 006, Schreiber Building,   בחדר 006, בניין שרייבר,
Tel-Aviv University, Ramat-Aviv.   אוניברסיטת תל-אביב, רמת-אביב

Lecture | הרצאה

EFFICIENTLY REASONING ABOUT PROGRAMS

Abstract

When Alan Turing defined his computing machines in his original 1936 paper, he proved that even the simplest problems about their behavior, e.g., does a given machine when started on input 0 eventually halt, was not computable. Thirty-five years later, Steve Cook presented SAT as the first NP-complete problem. The understanding was that SAT was an inherently infeasible computational problem. Now that a large and increasing part of our world is organized and controlled by computer programs, we need as much automatic help as possible to assure that our programs safely and faithfully do what they should do.

In this talk, I will describe a language and methodology that has been built up to reason about properties of programs, including the reachability of pointers in programs that destructively update data structures. We automatically define correctness conditions for these programs. These are translated to SAT problems and then, in practice, efficiently checked using SAT solvers.

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Light refreshments will be served before each lecture | כיבוד קל יוגש לפני כל הרצאה