

# James R. Slagle (/James+R.+Slagle)

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[Home](#) \* [People](#) \* **James R. Slagle**


**James Robert Slagle**, (born March 1, 1934)

an American mathematician, computer scientist, and since 1984 Distinguished Professor of Computer Science at the [University of Minnesota](#) , [Minneapolis](#) , with former appointments at [Johns Hopkins University](#) , [National Institutes of Health](#) , [Bethesda, Maryland](#) , [Naval Research Laboratory](#) , [Lawrence Radiation Laboratory](#), [University of California](#) and [Massachusetts Institute of Technology](#). As [Freshman Calculus](#) Student and Ph.D. candidate at MIT, supervised by [Marvin Minsky](#) <sup>[1]</sup> in 1961, he wrote his dissertation entitled *Heuristic Program that Solves Symbolic Integration Problems in Freshman Calculus, Symbolic Automatic Integrator (Saint)* <sup>[2]</sup>, which is acknowledged as first [Expert system](#) <sup>[3]</sup>. His further research interests covers [heuristic](#) [Theorem-Proving](#) and as application heuristic [search](#).

President [Dwight D. Eisenhower](#) , in 1959, presented him with five hundred dollars, awarded by Recording for the [Blind Inc.](#) , for outstanding work as a blind student <sup>[4]</sup>.

James R. Slagle <sup>[5]</sup>

## Saint

Quote by [Marvin Minsky](#) on Slagle's *Symbolic Automatic Integrator*, discussing his book [The Emotion Machine](#) <sup>[6]</sup> <sup>[7]</sup>:

Why don't we have artificial intelligence yet? There were some remarkable achievements in very early days of artificial intelligence. This is my favorite one, a young student who happened to be blind named James Slagle wrote a Ph.D. thesis in 1961 that was nearly as good as a good MIT freshman at doing intergroup calculus. Up until then there was no general theory of how to [integrate functions](#) . [Isaac Newton](#) invented the process but could not solve it. People like [Gauss](#) and others spent the next couple of centuries on it. By 1950, there was a great collection called the [Bateman Manuscript Project](#) run by the [American Mathematical Society](#) and they collected integrals.

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## Theorem-Proving

Abstract of *Experiments With a Multipurpose, Theorem-Proving Heuristic Program*. <sup>[8]</sup> from the [ACM](#)

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The heuristic program discussed searches for a constructive proof or disproof of a given proposition. It uses a search procedure which efficiently selects the seemingly best proposition to work on next. This program is multipurpose in that the domains it can handle are varied. As an initial experiment, the program was given the task of searching for proofs and disproofs of propositions about [Kalah](#) end games. Kalah is a two-person game. In another experiment the program, after some modifications, played the game of Kalah. This program was compared with another tree-searching procedure, the [Alpha-Beta](#) minimax procedure; the results have been encouraging since the program is fast and efficient. Its greatest usefulness is in solving large problems. It is hoped that this program has added one more step toward the goal of eventually obtaining computer programs which can solve intellectually difficult problems.

## M & N procedure

Abstract of *Experiments with the M & N Tree-Searching Program* <sup>[9]</sup> from the [ACM Portal](#):

The M & N procedure is an improvement to the mini-max backing-up procedure widely used in computer programs for game-playing and other purposes. It is based on the principle that it is desirable to have many options when making decisions in the face of uncertainty. The mini-max procedure assigns to a MAX (MIN) node the value of the highest (lowest) valued successor to that node. The M & N procedure assigns to a MAX (MIN) node some function of the M (N) highest (lowest) valued successors. An M & N procedure was written in LISP to play the game of Kalah, and it was demonstrated that the M & N procedure is significantly superior to the mini-max procedure. The statistical significance of important conclusions is given. Since information on statistical significance has often been lacking in papers on computer experiments in the artificial intelligence field, these experiments can perhaps serve as a model for future work.

## Selected Publications

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### 1959

- [James R. Slagle \(1959\)](#). [Formal integration on a digital computer](#) . 14th national meeting of the Association for Computing Machinery

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- [James R. Slagle \(1961\)](#). *A Heuristic Program that Solves Symbolic Integration Problems in Freshman Calculus*, *Symbolic Automatic Integrator (Saint)*. [pdf](#)
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- [James R. Slagle](#), [John K. Dixon \(1969\)](#). *Experiments With Some Programs That Search Game Trees* . [Journal of the ACM](#), Vol. 16, No. 2, [pdf](#) , [pdf](#)
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- [Chin-Liang Chang](#), [James R. Slagle \(1979\)](#). *Using Rewriting Rules for Connection Graphs to Prove Theorems* . [Artificial Intelligence](#)

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- [James R. Slagle](#), [John K. Dixon \(1980\)](#). *Finding a good figure that approximately passes through given points* . [Pattern Recognition](#), 1980
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- [Erach A. Irani](#) , [James R. Slagle](#), [John M. Long](#) , [John P. Matts](#) (1990). *Formulating an approach to develop a system for the temporal analysis of clinical trial data: The POSCH AI project* . [Annals of Mathematics and Artificial Intelligence, Volume 2, Numbers 1-4](#)
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## External Links

- [The Mathematics Genealogy Project - James Slagle](#)
- [The AI Genealogy Project :: James Slagle](#) » [Marvin Minsky](#)
- [Past Winners](#) of [United States Braille Chess Association](#) Tournaments
- [Slagle, who is blind, received the Class A trophy](#) , [The Free Lance-Star](#) February 01, 1971, from [Google news](#)
- [Elected AAAI Fellows](#)
- [Expert Systems with Applications - Editorial Board](#) , [pdf](#)

## References

1. [^ Personal page for Marvin Minsky](#)
2. [^ The Mathematics Genealogy Project - James Slagle](#)
3. [^ SAINT \(Inventions\) - what-when-how](#) (states James R. Slagle died in 1994)
4. [^ Education: Their Best](#) , [Time](#) , June 01, 1959
5. [^ Jet](#) , [January 22, 1970](#) , pp 21
6. [^ Terasem Journal of Personal Cyberconsciousness - Marvin Lee Minsky discussing his book, The Emotion Machine](#)
7. [^ Marvin Minsky's Home Page](#)
8. [^ James R. Slagle, Philip Bursky \(1968\). Experiments With a Multipurpose, Theorem-Proving Heuristic Program](#) . [Journal of the ACM](#), Vol. 15, No. 1
9. [^ James R. Slagle, John K. Dixon \(1970\). Experiments with the M & N Tree-Searching Program](#) . [Communications of the ACM](#), Vol. 13, No. 3
10. [^ JACM Authors - James R. Slagle](#)
11. [^ ICGA Reference Database](#) (pdf)
12. [^ dblp: James R. Slagle](#)
13. [^ Bibliography for Artificial Intelligence: A Modern Approach](#)
14. [^ Cooper: Review: James R. Slagle, Philip Bursky, Experiments with a Multipurpose, Theorem-Proving Heuristic Program](#)

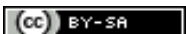
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