from α86

People at summer research project.

Solomonoff
Marvin Misky MIT Lincoln
John McCarthy IBM, Dartmouth
Claude Shannon MIT, Bell
Trench More IBM, MIT
Nat Rochester IBM Poughkeepsie
Oliver Selfridge MIT Lincoln
Julian Bigelow IAS
W. Ross Ashby Barnwood house (?)
W.S. McCulloch, MIT, RLE
Abraham Robinson Montreal logic
Tom Etter
John Nash MIT
David Sayre IBM New York
Samuels IBM on checkers
Shoulders MIT(RLE or Lincoln) components man
...... (with Shoulders)
Alex Bernstein IBM (New York) on chess
Herbert Simon: U of Pa (?)
Allen Newell: Rand

From about June 18 to Aug 17, 1956. I attended th Dartmouth summer research project on Artificial Intelligence. About 56 pages were done in this notebook — These later become a Multilith report of ≈ 55 pp. Also ∥ with this work, a notebook with pages numbered [(83 e.g.] was kept. The pp. of this N.B. ~~will be~~ are refered to e.g. by 83).16 . This N.B. has 104 pp. and goes from -1) to 102). Also an attempt at a prelim. report was written — this ran — ≈ 20 pp.

[pp α46 to α85 incl. is only 39 pp]

So 175 pp. written these 2 months: Rather large. Th. research project wasn't very suggestive.

Th. main things of value

1) Write and got report reproduced (very imp.)

2) Met some interesting people in this field.

3) Got idea of how poor most that in this field is.

4) Some ideas:

a) Search problem may be imp.

b) These guys may eventually invent a T.M., simply by working more and more interesting special problems. Simon and Newell; Minsky: best candidates — Trench More is a question mark.

5) Interested some of th. people in T.M. — May be able to get it programed on 704 or IAS computer.

Princeton Inst Adv. Study

A bunch of random imp. ideas on T.M.: Clean them up later.

.03 1) If we have $3x_i + 2y_i = z_i$ and this works for a few values of i, (x_i, y_i, z_i) being some intpst., then it should be possi. to realize more quickly that $3\boxed{1} + 2\boxed{2} = \boxed{3}$ is a sort of thing that one can plug a relation (1, 2, 3) into directly, without having to go back to

$(3x_i + 2y_i = z_i) = \boxed{1|2|3|4|5|6|7} \times (3, x_i, +, 2, y_i, =, z_i)$

— i.e. thru th. sth. There should be a more direct way to retain 3, +, 2, =, in their proper positions. How to do it: see α89.01

.21 Consider $x_i + 2x_i = 3x_i$. (several values of i gn. as examples)

$= \boxed{1|2|3|4|5|6} \times (x_i, +, 2, =, 3)$

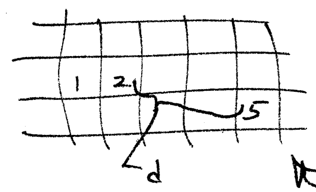
We must give "2" a much hyer aprip than th. set of all integers — similarly with "3". Otherwise th. predictions for $x + 2x = \square\square$ would be

$-\infty x \ldots 1x, 2x, 3x \ldots\ldots \infty x$.

In general in this sort of thing, th. aprip of a set must be < that of any of its components. This can be assured, if one has th. special operation, in which an object which is a set of objects can be xfmd into a set of individual objects; each individual U, and each individual $U_{aprip} >$ th. U_{aprip} of th. set of objects. (2

A ~~[illegible]~~ Mode by which I would like NMTM to work in changing U's of strs, ntps, ngms in time. If an ~~[illegible]~~ abs ($\equiv$ pugm) has been useful for a period of time, then its ~~[illegible]~~ is <u>not</u> useful for a long time — Then I would want its U to go down rather slowly, since abs's that have <u>once</u> been **useful**, tend to be useful again. — even tho they may be rather <u>un</u>-useful for a <u>while</u>.

.15 On th. "closeness" rule for strs. It is felt that the distance "d" should be a <u>major</u> contributor to th. detriment of U_{apri} with distance, but that th. difference betw. 5 and 2 should be something irrelevant. — I.e. th. 5 (skipping 3 and 4) can be performed by permuting, repeating or ommiting operations on th. <u>ntp</u> that this str. operates on — it should be done <u>before</u> th. <u>str.</u> is <u>used</u>.



Essentially, then, a str. may consist of only a set of squares with integers in them, but no repetitions or ommissions.

It is, perhaps, possl. to get along with <u>binary strs only</u>. E.G., to get

x_1 & x_1 & x_1, one would first use

$\boxed{1|2}$ on (x_1, x_1), then $\boxed{1|\;|2} \times (x_1, \boxed{1|2} \times (x_1, x_1))$.

A trouble mite be experienced with getting th. ngm x_i & y_i & z_i from th. ntp (x_i, y_i, z_i) $\boxed{96.06}$

.01 | from α 87.21 we can use th. ~~ngms~~ $N_1 \equiv 3 ᗺ + 2ᗺ =$

and $N_2 \equiv x_i\ ᗺᗺ\ y_i\ ᗺ\ z_i$ and

$\boxed{1|2} \times (N_1, N_2) = 3x_i + 2y_i = z_i$; $3ᗺ + 2x_i = y_i\ ᗺ\ z_i$

; $3ᗺ + 2ᗺ = x_i\ ᗺᗺ\ y_i\ ᗺ\ z_i$.

This ambiguity is rather irrelevant and disconcerting. — perhaps this ~~idea~~ idea of str. isn't so hot.

A rather strange, tho perhaps useful way to get these substitutions: multiply (x_i, y_i, z_i) by th. strst $\boxed{1|2|3}$, $\boxed{1|1|2|3}$, $\boxed{1|2||3}$, etc.

— i.e. th. set of all ~~ternar~~ linear strs., in which we have th. order 1, 2, 3. We get an ~~ref~~ ngmst. $\equiv$ [redacted] $[N_i^0]$ ~~we can multiply~~ which we can use with $N_1 \equiv (3ᗺ + 2ᗺ =)$ to get

$\boxed{1|2} \times (N_1, N_i^0)$ = all possl. substitutions of x_i, y_i, z_i, in that order. Unfortunately, there will be ~~very~~ many irrelevant ~~products~~ ngms resulting, but maybe they can be elim. somehow.

Actually, if one were given th. ~~pr~~ q. el:

$3x_3 + 2y_3 = \boxed{||}$ one could give only

~~[illegible]~~ $z_3\ ᗺᗺ$ or $ᗺ\ z_3\ ᗺ$ ~~ᗺ~~ $ᗺ\ ᗺ\ z_3$ as

correct ~~ans~~ answers.

Gen. Methodological Note:

On page Dart N.B. 99) are a bunch of imp. things that must be done for future T.M. work. Th. foll. seems to be clear: It would be well to work up some good MTM's that used ~~the~~ abstraction sets and hyer order sets. Concurrent with this (befor or after) work out details of NMTM.

__Then__ work out self-improvement program.

Keep eyes open for kinds of methods that __need not be built in - open loop,__ but would arise When T.M. began trying to improve itself.

Also, work out present T.M. in somewhat greater detail than in th. report. Use $U_{ij} \to \ln \frac{c_{ij}}{T}$ and actually ~~an~~ compute th. changes in th. U's, using some simplified approximation method.

List various important __groups__ of problems from Dart N.B. 99).

E.G. 1) NMTM

2) Self-improvement T.M.

3) Detailed mechanics of present T.M., with no abs. sets, or ~~natural~~ hyer order sets. General improvements.

4) a) abs. sets
b) hyer order sets.

5) Physical realization of T.M.

6) General remarks on overall T.M. philosophy.