

DECISION OF THE COMMISSIONER

STATUTORY - S.(2)(d): Programmed Computer

A computer that is programmed to operate in one way is a machine which is different from the same computer programmed to operate in another way. A process for conditioning the operation of a computer is an appropriate form of claims. A process for controlling the operation of a computer or for operating a computer may also be appropriate claims if not objectionable for redundancy. A process comprising of a new use if the programmed computer may be acceptable while a claim for a new use of a programmed computer is not.

FINAL ACTION: Directed Office policy overruled.

\* \* \* \* \*

IN THE MATTER OF a request for a review by  
the Commissioner of Patents of the Examiner's  
Final Action under Section 46 of the Patent  
Rules

AND

IN THE MATTER OF a patent application serial  
number 961,392 filed May 26, 1966 for an in-  
vention entitled:

COUNTING PREDETERMINED BITS IN A DATA WORD

Agent for Applicant

Messrs. Kirby, Shapiro, Curphey & Eades,  
Ottawa, Ontario.

\* \* \* \* \*

This decision deals with a request for review by the Commissioner of Patents of the Examiner's Final Action dated June 25, 1971 on Application Serial Number 961,392. This application was filed in the name of Gerald Waldbaum and refers to "Counting Predetermined Bits in a Data Word".

On October 20, 1971 the Patent Appeal Board held a hearing at which the applicant was represented by Mr. Charles Curphey, Ottawa agent; Mr. James W. Falk and Mr. Howard R. Popper, Bell Laboratories, New Jersey, U.S.A.; and Mr. R.H. Barrigar, Ottawa counsel.

In the prosecution terminated by the Final Action the Examiner refused the claims (sixteen in number) on the grounds that they were directed to non-patentable subject matter under Section 2(d) and Section 28(3) of the Patent Act.

The facts are as follows:

Claims 1 to 8 and 11 to 13 inclusive are directed to a method for controlling the operation of a data processor.  
Claim 9 is directed to a process for conditioning the operation of a data processor.  
Claims 10 and 16 are apparatus claims in terms of means plus function.  
Claims 14 and 15 are directed to a new use of a data processor.

Representative claims read as follows:

1. A method for controlling the operation of a data processor to determine the number of 1's in a data word; said data processor including a memory for storing data and instruction words at respective addresses; means for normally controlling the sequential execution of successively addressed instruction words; a plurality of registers; means for storing memory data words in said registers; means for performing logical operations on data words in said registers; and means responsive to the execution of a predetermined instruction word for examining the data word contained in a predetermined first one of said registers, changing the rightmost 1 in said first register to a 0 if said register contains at least one 1, controlling a transfer to the instruction word at a specified address if said first register contains all 0's and storing in a predetermined second one of said registers the address of the following instruction word if said transfer is made; comprising the steps of:

(1) controlling said storing means to store a memory data word whose number of 1's must be counted in said first register,

(2) controlling the data processor to execute a series of identical ones of said predetermined instruction word, and

(3) comparing the address of the first of the instruction words in said series with the content of said second register when a transfer is made during the execution of one of the instruction words in said series to derive the number of 1's in said data word.

9. A process for conditioning the operation of a data processor to determine the relative numbers of 0's and 1's in a data word; said data processor including a memory for storing data and instruction

words at respective addresses; means for normally controlling the sequential execution of successively addressed instruction words; a plurality of registers; means for storing memory data words in said registers; and means for controlling operations in the data processor in accordance with the instruction word being executed; comprising the steps of:

- (1) controlling said storing means to store a memory data word whose relative numbers of 0's and 1's must be determined in a first one of said registers;
- (2) executing a series of identical instruction words, each of which controls the data word in said one register to have its least significant bit of a predetermined value changed to the opposite value, and controls a transfer to be made to the instruction word at a specified address and the address of the next instruction word to be placed in a second of said registers if said first register contains bits of only said opposite value, and
- (3) controlling the comparison of the address of the first of the instruction words in said series with the content of said second register when a transfer is made during the execution of one of the instruction words in said series to determine the relative numbers of 0's and 1's in said data word.

10. A data processor having a memory for storing data and instruction words at respective addresses; means for normally controlling the sequential execution of successively addressed instruction words; a plurality of registers; means for storing memory data words in said registers; said data processor being programmed to determine the relative numbers of 0's and 1's in a data word in accordance with instruction words stored in said memory for:

- (1) controlling said storing means to store a memory data word whose relative numbers of 0's and 1's must be determined in a first one of said registers;
- (2) executing a series of identical instruction words, each of which controls the data word in said one register to have its least significant bit of a predetermined value changed to the opposite value, and controls a transfer to be made to the instruction word at a specified address if said first register contains bits of only said opposite value, and
- (3) determining from the number of the instruction words in said series which are executed before said transfer is made the relative numbers of 0's and 1's in said data word.

14. A process comprising a new use of a stored program data processing apparatus including an addressable memory for storing data words and instructions for processing said data words, means for executing said instruction, means for transferring to an instruction stored at a particular address as the result of executing said instructions and means for comparing data including said addresses obtained from said memory unit, said new use being the counting of the number of bits of a predetermined type in one of said data words and said process comprising the steps of:

- (a) executing one instruction of a series of instructions stored in successive addresses in memory for each bit of said predetermined type detected in said data word,
- (b) transferring to a return address when no more bits of said predetermined type are detected in said data word, and
- (c) comparing the addresses of the first and last executed ones of said instructions to compute the number of said predetermined type of bits in said data word.

15. A new use for the program address register of a stored program data processing apparatus which comprises repetitively employing said register to store the addresses of a series of instructions so that by subtracting the address of the first of said series instructions from the address of the last executed one of said series of instructions the number of bits of a particular type in a data word may be ascertained comprising the steps of:

- (a) inserting in said register the first address of a series of instructions stored in successive addresses in said memory,
- (b) executing one instruction in said series of instructions and incrementing the address in said register each time a bit of said predetermined type is detected in said data word,
- (c) transferring to a return address when no more bits of said predetermined type are detected in said data word, and
- (d) subtracting the addresses of the first and last executed ones of said instructions to compute the number of said predetermined type of bits in said data word.

At the outset I think I should make it quite clear that the Examiner's Actions in this case were complete, proper and in conformance with Patent Office guidelines relating to the patentability of computer programs, or, to be more accurate, programmed computers and programming processes.

Subsequent to the Appeal, and both before and after the Hearing, a great deal of study and discussion has taken place in the Patent Office regarding the policy that should be followed by Canada in relation to the patentability of computer programs, and the Patent Appeal Board has been intimately involved in all aspects of the problem.

In both written and oral submissions, the applicant has stated that it does not consider that computer programs are patentable subject matter under Section 2(d) or any other section of the Patent Act, or that instructions or lists of instructions for operating a computer are patentable. The Board is in full agreement with this expressed stand and accepts that the claims in the application do not define a computer program per se.

The term program is taken to mean a set of ordered steps or list of instructions specifying the internal changes of state of physical devices within a data processor. This set of steps or list of instructions may be recorded on a variety of media including printed or handwritten lists on paper, punched cards or paper tapes, magnetic tapes or electric wiring. No matter what form of device is used to record a program, it is not patentable as a program. This is the conclusion that has been reached in many countries and I can find no reason for the Patent Office to hold a different view.

As indicated above, applicant's claims are in terms of a process, an apparatus, and a new use. I shall deal with the apparatus first.

Without going into the detailed operation of the invention, applicant has taken an admittedly known data processor (I shall use the term "computer" for the purpose of convenience) and associated it with a telephone system for the purpose of determining telephone traffic density. The computer is programmed in such a way that its main memory is made to count the number of busy trunks as indicated on a 23-trunk register called a K-register. The register shows busy trunks as 1 digits and open trunks as 0 digits.

Prior to applicant's invention it was submitted that the normal way of performing the counting operation required a counter directly connected to the K-register. The computer then had to be modified by rewiring it or using a stored program technique which required three times as many operations to be performed as are required with applicant's arrangement which has no direct connection between the K-register and the main memory and furthermore eliminates the need for the counter connected to the K-register.

It was submitted that applicant has obtained an unexpected result since it was not previously appreciated that this known computer could be made to operate in this manner until applicant had devised this particular program. It is applicant's stand

that the programmed computer is a machine that is caused to operate in a new and unobvious way and is thus a new and patentable machine.

As I see it, the basic question that must be decided here is whether a computer that is programmed in one way is a machine which is different from the same computer when programmed in another way.

In the absence of pertinent Canadian jurisprudence applicant supported its stand by referring to the following British and United States cases:

British

Badger Co. Incorporated's Application (1970) R.P.C. 36  
Gever's Application (1970) R.P.C. 91  
Slee & Harris's Application (1966) R.P.C. 194

United States

In re Bernhart and Fetter 163 U.S.P.Q. 611 (1969)  
In re Prater and Wei 162 U.S.P.Q. 541 (1969)  
In re Musgrave 167 U.S.P.Q. 280 (CCPA) (1970)

In referring to the British cases the applicant submitted that the statements of the British Court have significance in Canada in view of the statement in Lawson v Commissioner of Patents 62 C.P.R. 101 that:

Therefore it is accepted in principle that the requirements with regard to subject matter of a patent are co-extensive under the British and Canadian statutes and that the jurisprudence established by the Courts of the United Kingdom is authoritative in Canada. (Emphasis added by applicant).

It was submitted that Claim 10 is an apparatus claim patterned after the form of claim that was found acceptable by the Superintending Examiner of the British Patent Office in Slee and Harris (supra). It is noted that this case was not heard by the Patents Appeal Tribunal since there was no need for an appeal.

In regard to the other apparatus claim, Claim 16, it was submitted that this is in a form which was allowed in the Badger case (supra).

It is noted that both apparatus claims recite a plurality of "means" related to parts of a computer and go on to add functional statements concerned with "controlling", "executing", and "determining" in response to a program. The apparatus claims are thus in terms of means plus function but in my view they should not be objectionable for that reason alone if the subject matter is not susceptible of being claimed in terms of structure.

I have studied the British Patent Office decision in the Slee and Harris case and the two decisions of the British Patents Appeal Tribunal listed above and it is clear to me that both bodies recognize that inventions involving programmed computers are proper subject matter for patent protection. It is also clear to me that although some formalities may have to be observed in drafting claims, there is nothing in the Appeal Tribunal decisions to suggest that inventions involving programmed computers should not satisfy the usual tests of novelty, utility and inventive ingenuity. The Appeal Tribunal has found that a computer when programmed or controlled in a certain way is indeed a statutory manner of manufacture. The computer may be controlled to operate in an obvious manner, in which case, of course, no patent may be had, or it may be controlled to operate in a new and unobvious manner, in which case a patent for a computer so controlled is justified. In the Geyer case (supra) Graham, J. carefully set forth the Patent Office's statement of invention as enunciated by the Superintendent Examiner and after agreeing with it went on to say: "it should, I think, have stated further that the invention claimed is for a data processing apparatus which is so constructed and arranged -- that the three steps which Mr. Hudson has listed can be carried out by operating it".

Turning to the United States decision of the United States Court of Customs and Patent Appeals in the case of In re Bernhart and Fetter (supra) the Court held that "if a machine is programmed in a certain new and unobvious way, it is physically different from the machine without that program; its memory elements are differently arranged. The fact that these physical changes are invisible to the eye should not tempt us to conclude that the machine has not been changed".

The Bernhart & Fetter case corresponds with the British Badger Co. case. Thus both countries have taken similar stands with regard to the patentability of programmed computers.

It is recognized that decisions of British courts exercise considerable authority on Canadian jurisprudence. It is also apparent that Section 2(d) of the Patent Act closely resembles Section 101 of United States Code, Title 35-Patents.

In view of all the foregoing I have reached the conclusion that claims 10 and 16, insofar as they define a machine which is programmed or controlled so as to operate in a new and unobvious manner, do not offend Section 2(d) of the Patent Act.

Having determined that the subject matter of Claims 10 and 16 falls within Section 2(d) of the Act, the rejection under Section 28(3) fails because the claims are not directed to a scientific principle or abstract theorem.

Dealing now with Claims 1 to 8 and 11 to 13 which are directed to a method for controlling the operation of a computer, it is observed that this is a type of claim which does not appear to be allowable by the British Patent Office because the result of the method would be intellectual information and therefore not a manner of manufacture.

In the present case I think it is proper to equate a method for controlling the operation of a machine with a method of operating a machine and since the Canadian Patent Office regularly permits claims to methods of operation I would not normally entertain objections to such claims. However, since the apparatus claims in this application distinguish the invention by reciting method steps it may be that claims 1 to 8 and 11 to 13 should be scrutinized for redundancy, although since this point was not raised in the Examiners Final Action I am not required to make a determination.

Claim 9 defines a process for conditioning the operation of a data processor. It was submitted that this is a type of claim allowed by the Patents Appeal Tribunal in the Badger case. I can find no reason for objecting to this claim on the ground that it does not properly define the invention.

Claim 14 defines a process comprising a new use of a stored program data processing apparatus. Claim 15 defines a new use for the program address register of a stored program data processing apparatus. In Lane-Fox v The Kensington and Knightsbridge Electric Lighting Co. Ltd. 9 R.P.C. 416, Lindley, L.J. said:

On the one hand, the discovery that a known thing can be used for a useful purpose for which it has never been known before is not alone a patentable invention, but on the other hand, the discovery how to use such a thing for such a purpose will be a patentable invention, if there is novelty in the mode of using it as distinguished from novelty of purpose.

This statement supports the Patent Office practice of refusing claims directed to a new use and in my view Claim 15 is not a proper type of claim since it merely expresses a purpose. Claim 14 on the other hand may be considered an acceptable type of claim since it expresses a mode of using the known computer, however it may still be subject to the same objection (redundancy) which I suggested in connection with Claims 1 to 8 and 11 to 13.

In conclusion I am satisfied that the answer to the basic question which I stated earlier, is that a computer that is programmed in one way must be deemed to be a machine which is different from the same computer when programmed in another way



or unprogrammed. Accordingly I find that the Examiner's rejection under Section 2(d) and Section 28(3) of the Patent Act is not proper and recommend that the Final Action be withdrawn.

R.E. Thomas,  
Chairman, Patent Appeal Board.

I concur with the findings of the Patent Appeal Board and withdraw the Final Action. The application will be returned to the examiner for resumption of prosecution.

Decision accordingly,

A.M. Laidlaw,  
Commissioner of Patents.

Dated at Ottawa, Ontario,  
this 8th day of December, 1971.