Keywords: **35 U.S.C. § 101, patentable subject matter, process claim, mathematical algorithm, mental process, abstract idea**

General: **The Supreme Court held that an invention claimed as a process that is (a) defined by an algorithm with no practical use except in the programmed manipulation of signals in a digital computer, and (b) not limited to a subset of possible applications, do not fall within the requirements of statutory subject matter under Section 101.**

Gottschalk v. Benson
409 U.S. 63 (1972)
Decided November 20, 1972

I. Facts

In 1963, Gary Benson and Arthur Tabbot filed a patent application (the "Benson Application") with the United States Patent and Trademark Office (USPTO) that was assigned to Bell Labs and related to techniques for converting binary coded decimal (BCD) numbers into pure binary numbers on a general purpose computer.

a. Decimal representation for 123:	**$1*(10^2) + 2*(10^1) + 3*(10^0)$**
b. Binary coded decimal (BCD) representation for 123:	**0001 0010 0011** **(1) (2) (3)**
c. Pure binary representation for 123:	**$1*(2^6) + 1*(2^5) + 1*(2^4) + 1*(2^3) + 0*(2^2) + 1*(2^1) + 1*(2^0)$** **1111011**

During examination, independent claims 8 and 13 of the Benson Application were rejected by the USPTO for failing to qualify as a patent-eligible "process" within the meaning of the Patent Act. The claims at issue recite:

> 8. The method of converting signals from binary coded decimal form into binary which comprises the steps of:
>
> (1) storing the binary coded decimal signals in a reentrant shift register;
>
> (2) shifting the signals to the right by at least three places, until there is a binary '1' in the second position of said register;
>
> (3) masking out said binary '1' in said second position of said register;
>
> (4) adding a binary '1' to the first position of said register;
>
> (5) shifting the signals to the left by two positions;
>
> (6) adding a '1' to said first position; and
>
> (7) shifting the signals to the right by at least three positions in preparation for a succeeding binary '1' in the second position of said register.
>
> ….
>
> 13. A data processing method for converting binary coded decimal number representations into binary number representations comprising the steps of:
>
> (1) testing each binary digit position *i*, beginning with the least significant binary digit position, of the most significant decimal digit representation for a binary '0' or a binary '1';

> (2) if a binary '0' is detected, repeating step (1) for the next least significant binary digit position of said most significant decimal digit representation;
>
> (3) if a binary '1' is detected, adding a binary '1' at the (*i*+1)th and (*i*+3)th least significant binary digit positions of the next lesser significant decimal digit representation, and repeating step (1) for the next least significant binary digit position of said most significant decimal digit representation;
>
> (4) upon exhausting the binary digit positions of said most significant decimal digit representation, repeating steps (1) through (3) for the next lesser significant decimal digit representation as modified by the previous execution of steps (1) through (3); and
>
> (5) repeating steps (1) through (4) until the second least significant decimal digit representation has been so processed.

Benson subsequently appealed the rejection of these claims to the Board of Patent Appeals and Interferences, which ultimately affirmed the Examiner's rejection. Benson then appealed to the Court of Customs and Patent Appeals (CCPA), which reversed the Board's decision and held that independent claims 8 and 13 did qualify as patent-eligible processes under Section 101. Thereafter, Robert Gottschalk, the Commissioner of Patents, filed a petition for a writ of certiorari to the U.S. Supreme Court. Numerous briefs were filed by the parties and various *amici curiae* were also filed covering a variety of policy arguments.

II. Issue

Did the CCPA err in holding that the processes claimed in the Benson Application qualified as statutory subject matter under Section 101?

III. Discussion

Yes. The Court held that the rejected claims of the Benson Application were directed to processes that were not patentable subject matter, as they essentially claim a mathematical algorithm that was "abstract" in the sense that it had no substantial practical application except in connection with a digital computer. The Court noted that because Benson's claims were not limited to any particular type of programmable digital computer and neither involved special purpose implementing machinery nor a transformation of substances, allowing such a claim to issue would effectively preclude others from using this mathematical algorithm in any currently known or future invention in any field. For instance, the Court noted that the "processes" claimed by Benson were so "abstract and sweeping" that they could cover known uses of BCD-to-binary conversion (e.g., train operation, legal research, data verification, etc.) as well as unknown uses, and could be performed using any existing or later-invented machine.

In reaching the foregoing conclusion, the Court analyzed Benson's claims in view of the holding in several earlier cases. First, the Court looked at *Mackay Radio and Telegraph Co. v. Radio Corp. of America*, 306, U.S. 86 (1939), which generally held that mathematical expressions by themselves are not patentable.

Next, the Court discussed a set of cases in a manner with seems to "loosely" establish what is now commonly referred to as the "machine-or-transformation test." First, Court explored the holdings from *O'Reilly v. Morse*, 56 U.S. 62 (1853) and *Dolbear v. American Bell Telephone Co.*, 126 U.S. 1 (1888), which, as implied by the Court, held that for a process to be patentable under Section 101, it needed to be tied to a particular application which may be carried out using machinery. Specifically, Court's discussion of *O'Reilly* and *Dolbear* seems to focus more on limiting the use of electricity and electro-magnetism to particular applications (e.g., telegraph, telephones).

The Court then cited *Corning v. Burden*, 56 U.S. 252 (1853) and *Cochran v. Deener*, 94, U.S. 780 (1877), both of which generally held that a process could be patentable irrespective of whether it is tied to a particular mechanical device or instrument, provided that the process includes an act or series of acts that causes a transformation of an article upon which the act is performed into a different state or thing.

Based on the foregoing analysis, the Court concluded that "[t]ransformation and reduction of an article to 'a different state or thing' is the clue to the patentability of a process claim that does not include particular machines" (emphasis added). However, the Court specifically rejected the notion of the machine-or-transformation test being the only test for determining whether a process claim qualifies as patentable subject matter under Section 101.

With regard to Benson's claims, the Court again emphasized that Benson's claims were essentially directed to a computer program that performs the BCD-to-binary algorithm. The Court concluded by stating that since the BCD-to-binary algorithm was found to be a mathematical formula that was abstract in the sense that there was no substantial practical application exception in connection with a digital computer, a patent on these claims would essentially pre-empt the use of this mathematical formula and effectively be a patent on the algorithm itself. Accordingly, the Court reversed the CCPA's finding and held Benson's claims unpatentable under Section 101.

IV. Conclusion

The U.S. Supreme Court held that a process involving a numerical algorithm was not patentable if the patent would wholly pre-empt the use of the algorithm and, in practical effect, be a patent on the algorithm itself.

The U.S. Supreme Court's holding in *Bilski v. Kappos*, 561 U.S. ____ (2010) appears to be generally consistent with holding in Benson, at least with regard to the machine-or-transformation test not being the exclusive test for determining whether a process is patentable subject matter under Section 101.