



BL O/066/06

14th March 2006

PATENTS ACT 1977

APPLICANT ARM Limited

ISSUE Whether patent application
GB0228084.0 complies with section 1(2)

HEARING OFFICER H Jones

DECISION

Introduction

- 1 Patent application GB0228084.0, entitled "Compilation of application code in a data processing apparatus", was filed in the name of ARM Limited on 2nd December 2002, claiming priority from US application US10206830 filed on 29th July 2002. The application was searched and later published as GB2391348 on 4th February 2004.
- 2 During substantive examination of the application, the examiner raised an inventive step objection based on prior art documents found during the course of the search, together with a more fundamental objection that the invention was excluded from being patentable under section 1(2) as being a method for performing a mental act embodied in a computer program. The application's claims were amended to overcome the inventive step objection but, despite further correspondence on the matter between the applicant's agent and the examiner, it was not possible to resolve the issue of allowability under section 1(2).
- 3 The matter came before me to decide at a hearing on 16th February 2006 where the applicant was represented by Dr Susan Keston of D Young & Co.

The Application

- 4 The application relates to an optimised compiler of application code in a data processing apparatus. The software compiler responds to input signals derived from a non-invasive trace unit coupled to the processing apparatus in order to improve the effectiveness of the compilation process.
- 5 The application acknowledges that trace units associated with data processors for debugging sequences of processing instructions executed in a data processing system are well known, and refers to the applicant's own Embedded Trace Macrocell (ETM) as an example of such a trace unit. ETMs are usually software-configured programmable logic blocks provided on the same chip as the data processor. The application suggests that information gathered by such trace units is used by software programmers to analyse the performance of the compilation process and then to effect manual improvement of the compiler code. In order to provide a non-invasive process which requires no intervention from a software programmer, the applicant

proposes to generate trace signals that could be used to control directly the compilation of application code by the compiler.

- 6 The application has two independent claims sharing the same inventive concept (apparatus claim 1 and method claim 24). For the purpose of this decision it is only necessary for me to recite the first independent claim, claim 1:

“A data processing apparatus, comprising:
a processor;
a compiler for compiling application code to generate instructions for execution by the processor;
a non-invasive trace unit coupled to the processor for generating, from input signals received from the processor, trace signals indicative of the instructions being executed by the processor;
the compiler being arranged to control the compilation of the application code dependent on the trace signals.”

The Law

- 7 The examiner has argued that the claimed invention relates to subject matter excluded from patentability under section 1(2) of the Act, in particular to a method for performing a mental act and a program for a computer under section 1(2)(c). The relevant parts of this section read:

1(2) It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of

-

(a)

(b)

(c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;

(d)

but the foregoing provision shall prevent anything from being treated as an invention for the purpose of this Act only to the extent that a patent or application for a patent relates to that thing as such.

- 8 These provisions are designated in section 130(7) as being so framed as to have, as nearly as practicable, the same effect as Article 52 of the European Patent Convention (EPC), to which they correspond. I must therefore also have regard to the decisions of the Boards of Appeal of the European Patent Office (EPO) that have been issued under this Article in deciding whether the present invention is patentable.

Interpretation

- 9 In July 2005, shortly after the first substantive examination report had been issued, Peter Prescott QC, sitting as a Deputy Judge of the High Court, handed down judgment in *CFPH*¹ which raised questions regarding the UK Patent Office's practice in dealing with applications considered to relate to matter excluded by section 1(2). A key argument raised in *CFPH* was that UK Patent Office practice in the field of excluded subject matter was different to that of the EPO, despite the requirement under section 130(7) that section 1(2) should have, as nearly as practicable, the same

¹ *CFPH LLC's Application [2005] EWHC 1589 (Pat)*

effect as Article 52 of the EPC.

- 10 This difference in practice between the UK Patent Office and the EPO had already been acknowledged in a number of decisions issued by Hearing Officers at the Patent Office, e.g. *Applied Psychology Limited*² and *Outersonic Limited*³, although it was concluded on the facts of those cases that the two approaches led to the same result. In *CFPH*, Mr Prescott came to a similar conclusion, i.e. that the two approaches would usually lead to the same results on the same set of facts if properly applied.
- 11 Nevertheless, in response to Mr Prescott's judgment in *CFPH*, the UK Patent Office issued a practice notice dated 29th July 2005 announcing an immediate change in the way that it examines applications for patentability. At the hearing, Dr Keston agreed that the *CFPH* approach subsequently adopted by the examiner was correct in deciding the matter in issue, the appropriate test being set out as follows:

Identify what is the advance in the art that is said to be new and not obvious (and susceptible of industrial application).

Determine whether it is both new and not obvious (and susceptible of industrial application) under the description "an invention" in the sense of Article 52 of the European Patent Convention (EPC) - broadly corresponding to section 1 of the Patents Act 1977.

- 12 Once the new and non-obvious advance has been identified, Mr Prescott suggests⁴ that it would often be possible to determine whether this was an advance under the description of an invention by asking "Is this a new and non-obvious advance in technology". However, because of the difficulty sometimes associated in determining what is meant by technology, Mr Prescott says that if there is any doubt in this regard then it will be necessary to have recourse to the terms of Article 52 of the EPC. Subsequent judgments issued by the High Court (*Halliburton*⁵, *Shoppalotto*⁶, *Crawford*⁷ and *RIM v Inpro*⁸) all point to a similar requirement for a technical advance in order to pass the test for patentability, and Dr Keston fully accepted this interpretation of section 1(2).

Argument

- 13 The examiner argues, and indeed the applicant accepts, that the advance in the art is the use of data from a non-invasive trace unit to direct compilation of application code. What remains to be decided is whether this advance can be regarded as an advance in technology or is merely an improved method for performing a mental act or an improved computer program.

Mental Act

- 14 Dr Keston argued that the act of translating a high-level language computer program into application code, i.e. compiling, could not in anyway be regarded as a mental act. Her argument was based on the fact that compilation involves conversion of instructions from a form that a human being could understand into a language that only a computer could understand. She went on to argue that even if humans were

² BL O/208/04

³ BL O/273/04

⁴ See *CFPH* paragraph 97

⁵ *Halliburton Energy Services Inc v Smith International (North Sea) Ltd and others* [2006] RPC 25

⁶ *Shopalotto.com's Application* [2005] EWHC 2416 (Pat)

⁷ *Cecil Lloyd Crawford's Application* [2005] EWHC 2417 (Pat)

⁸ *Research In Motion UK Ltd v Inpro Licensing* [2006] EWHC 70 (Pat)

capable of writing instructions in application code, a software engineer would not start from a high level language such as C++ and translate into application code because of the complexity of the task. The examiner disagreed, suggesting that it was commonplace for software engineers when writing application code to start initially with human-readable language and then to convert into application code. It was clearly more convenient to have a computer do this instead of a human programmer, and, no doubt, a lot faster and less expensive, but the act of translating a human-readable language into a machine readable one was essentially a mapping function that could easily be undertaken mentally.

- 15 I agree entirely with the examiner on this. The act of compilation in a computer processor is analogous to that of translating from one foreign language to another, where anyone given the right mapping functions of vocabulary and grammar could, with a bit of effort, successfully translate from one language to another. In much the same way that it would not be right to grant patents to the process of foreign language translation, so too is it not right to allow patents to the mere compilation of high-level computer languages into application code. I consider that the mental act exclusion of section 1(2)(c) provides a basis for ensuring that compilers are not patentable.
- 16 Having said that, I do not consider that the advance in the art made by the invention is simply the conversion of one language to another. As I have already outlined above, the advance made is in the use of data from a non-invasive trace unit to direct compilation of application code, which goes beyond mere compilation.

Computer Program

- 17 A computer program can be regarded as a set of rules or instructions provided to a computer processor to fulfill a task or series of actions. The optimised compiler described in the present application provides a new and non obvious advance over the prior art in that it accesses information regarding the performance of the compiler from a non-invasive trace unit and uses this information to improve subsequent compilation. It can easily be seen how this information gathering routine and subsequent modification of the compilation rules could be embodied as a series of instructions provided to a computer processor and trace unit, and be packaged as a computer program to run on suitably equipped computer processors. Nevertheless, if the advance over the prior art provides an advance in technology then the invention ought to be patentable. Or, as Dr Keston re-phrased it, does the advance cause the computer to function differently at a technical level, rather than just at a program level? If it does, the patent application should be granted.
- 18 As I have already explained above, the ability to modify the compilation process in response to performance data obviates the need to interrupt the compilation process and improve the compiler code through human intervention. This results in a faster, more accurate compiler, able to adapt and improve in an iterative manner each time the compiler is used. These advantages, I believe, are technical advantages, not merely “cosmetic” changes to the way the compiler software operates, how it is written or how it interacts with its interfaces. As a result, I consider that the advance is of a technical nature such that it cannot be regarded as merely a computer program as such.

Conclusion

- 19 I have decided that the advance in the art is both new and non obvious (and susceptible of industrial application) under the description “an invention”. As a result, the invention claimed in this application is not excluded from patentability by section 1(2)(c), and I will return the application to the examiner for it to be put in order for grant.

H Jones

Deputy Director acting for the Comptroller