

can be guaranteed.

5 As amended, claim 1 reads:

“A method of automatically allocating software tasks to processors in a processor array, wherein the processor array comprises a plurality of processors having connections which allow each processor to be connected to each other processor as required, the method comprising:
receiving definitions of a plurality of processes, at least some of said processes being shared processes including at least first and second tasks to be performed in first and second unspecified processors respectively, each shared process being further defined by a frequency at which data must be transferred between the first and second processors, *wherein said frequency is expressed as a number of times in a sequence period, and said number of times can be selected to be more than one;*
and the method further comprising:
automatically statically allocating the software tasks of the plurality of processes to processors in the processor array, and allocating connections between the processors performing said tasks in each of said respective shared processes at the respective defined frequencies.”;

the italicised wording was added to the original claim in order to overcome the examiner’s objections to lack of novelty and inventive step. There are also corresponding independent claims 7 and 8 to a computer software product for performing the above method steps and to a processor array in association with the software product.

6 A further independent claim 9 to a processor array is also provided, which (except for a minor clarification) has not been amended and reads:

“A processor array, comprising:
A plurality of processors,
wherein the processors are interconnected by a plurality of buses and switches which allow each processor to be connected to each other processor as required,
wherein each processor is programmed to perform a respective statically allocated sequence of operations, said sequence being repeated in a plurality of sequence periods,
wherein at least some of said processes performed in the array involve respective first and second software tasks to be performed in respective first and second processors, and
wherein, for each of said processes, required connections between the processors performing said tasks are allocated at fixed times during each sequence period.”

The law and its interpretation

7 Section 1(2) reads:

“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) a discovery, scientific theory or mathematical method;
- (b) a literary, dramatic, musical or artistic work or any other aesthetic creation whatsoever;
- (c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;
- (d) the presentation of information;

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

8 As the examiner has pointed out, the assessment of patentability under section 1(2) is now governed by the above-mentioned *Aerotel* judgment, in which the Court of Appeal reviewed the case law and approved a new four-step test for the assessment, namely:

- 1) Properly construe the claim
- 2) Identify the actual contribution (although at the application stage this might have to be the alleged contribution)
- 3) Ask whether it falls solely within the excluded matter
- 4) Check whether the actual or alleged contribution is actually technical in nature.

9 The operation of the test is explained at paragraphs 40-48 of the judgment. Paragraph 43 confirms that identification of the contribution is essentially a matter of determining what it is the inventor has really added to human knowledge, and involves looking at substance, not form. Paragraphs 46-47 explain that the fourth step of checking whether the contribution is technical may not be necessary because the third step should have covered the point, and that a contribution which consists solely of excluded matter will not count as a technical contribution.

10 It will not therefore be necessary for me to go on to the fourth *Aerotel* step if the invention falls at the third step - notwithstanding that the Court followed *Merrill Lynch's Application* [1989] RPC 561 approving the European Patent Office Board of Appeal decision in *Vicom* (T 208/84) that a technical contribution was decisive of the matter¹.

Argument and analysis

11 On the basis of the four-step *Aerotel* test, the examiner considers that the contribution of the invention falls solely within the computer program and mental act exclusions of section 1(2). However the applicant believes that the examiner has not correctly or consistently applied the test.

¹ See *Oneida Indian Nation's Application* [2007] EWHC 954 (Pat), paragraphs 10-11

First step – construction of the claims

- 12 The examiner has pointed out that, although the specification refers to the use of a schedule to allocate hardware “channels” between the processors that are executing the shared processes in order to allow them to communicate freely, the claims merely require the processors to communicate at the appropriate time. For the avoidance of doubt, I should make clear that I am interpreting the references in the claims to “connections” between the processors as meaning no more than that there must be some sort of communications link. For the purposes of this decision, I do not think that anything turns on the possible ambiguity noted by the examiner.
- 13 I also note that claim 9 has not been amended in corresponding fashion to the other independent claims. However, the concluding limb requiring connections between the processors to be established “at fixed times during each sequence period” would appear to import a similar, if not identical, limitation.

Second step – the contribution of the invention

- 14 The closest prior art cited by the examiner is specification US 5 367 678 (Lee). Lee discloses a multiprocessor system including a stored schedule in the form of an ordered list of all the transactions of the processes associated with a particular task, the schedule defining an order of access to a shared bus for the processors which are to carry out the task. The examiner therefore considers that the contribution of the invention lies in the particular method by which the processes are allocated among the processors and the connection frequency between the processors is scheduled. However he identifies the contribution of claims 7 and 8 to lie in embodying the invention as a computer software product.
- 15 The applicant believes that the contribution includes the details of the scheduling process, involving defining the shared processes by the frequency at which data must be transferred between the processors. It thinks that the examiner failed to recognise this aspect of the invention when dismissing it as “nothing more than an exercise in programming” in his report of 15 May 2007, and ignored it when determining the contribution of claims 7 and 8. Further, in the applicant’s view claim 9 in particular says nothing about how the defined connections are allocated but merely defines a device having a specific set of connections between the processors, which cannot be regarded as a computer program or a mental act as such.
- 16 Before deciding whether any contribution relates solely to excluded matter, I must decide what the contribution actually is. As the examiner has correctly stated and as I have explained above, this is to be determined as a matter of substance and not on the form of the claims – the question being what is it that the inventor has really added to human knowledge (see *Aerotel* at paragraph 43).
- 17 Clearly there is nothing new in providing an array of processors which can be connected to each other as required, or in providing such connections by means of buses and switches. The latter and preferred form of the array is disclosed in the applicant’s earlier specifications GB 2 370 380 A (cited by the examiner) and

the equivalent WO 02/50624 A2 (referred to in the present specification). Nor, as appears from Lee, is there anything new in providing a schedule for the allocation of parallel processors to processing tasks.

- 18 Unlike Lee, which is a “self-timing” system in which the execution time is determined by the availability of the particular processor, the invention provides fully static allocation of processing tasks by determining execution time as well as assignment of task to processors and their ordering. However, as Lee explains, static allocation is a known solution to the allocation problem, and so there is nothing new in that per se. It therefore seems to me that what the inventor has contributed is a method of allocation in which the shared process is defined by the frequency or (having regard to the slightly different wording of claim 9) the particular times within a sequence period or cycle at which data is to be transferred between the processors carrying out the tasks in the process. As the specification explains at page 19:

“Using the methods outlined above, software processes can be allocated to individual processors, and slots can be allocated on the array buses to provide the channels to transfer data. Specifically, the system allows the user to specify how often a communications channel must be established between two processors which are together performing a process, and the software tasks making up the process can then be allocated to specific processors in such a way that the required establishment of the channel is possible.

This allocation can be carried out either manually or, preferably, using a computer program.”

- 19 In my view this method of allocation is the contribution underlying all the independent claims irrespective of their form. I cannot see that there is any distinct contribution in embodying this method as a computer software product so that it can be executed on a computer or processor array, which is all that claims 7 and 8 add. In regard to claim 9 I cannot agree with the applicant that it says nothing about how the defined connections are allocated. The claim specifically requires the processors to be programmed in a way - defined in the concluding three limbs of the claim - which allocates the tasks at fixed times during each sequence period.

Third step – does the contribution fall solely within excluded matter?

- 20 I do not doubt that the method which I have identified above as the contribution improves the efficiency of allocating processors to processing tasks. However what it provides is summed up concisely at page 15 lines 5-10 of the specification: “a method of capturing a programmer’s intentions concerning communications bandwidth requirements between processors and using this to assign bus reserves to ensure deterministic communications”. It seems to me this contribution is indeed, as the examiner argues, “nothing more than an exercise in programming” which simply feeds into the processor array information provided by the user as to how the processors should be allocated and their operation timed. It does not bring about any improvement in the processors

themselves or the underlying operation to which they relate.

- 21 In my view, depending on whether or not the invention is implemented by way of a computer program, the contribution falls wholly within either the computer program or the mental act exclusion.

Fourth step – is the contribution technical in nature?

- 22 In the light of this finding, as explained above it is not necessary for me to consider whether it is technical in nature.

Conclusion

- 23 I therefore conclude that claims 1, 7, 8 and 9 relate either to a computer program as such or to a method for performing a mental act as such, and are therefore excluded from patentability under section 1(2). Having read the specification, I cannot see that any saving amendment is possible.

- 24 I therefore refuse the application under section 18(3).

Appeal

- 25 Under the Practice Direction to Part 52 of the Civil Procedure Rules, any appeal must be lodged within 28 days.

R C KENNEL

Deputy Director acting for the Comptroller