



Neutral Citation Number: [2023] EWHC 222 (Ch)

Case No: IL-2022-000069

**IN THE HIGH COURT OF JUSTICE**  
**BUSINESS AND PROPERTY COURTS OF ENGLAND AND WALES**  
**INTELLECTUAL PROPERTY LIST (ChD)**

Rolls Building, Fetter Lane  
London, EC4A 1NL

Date: 7<sup>th</sup> February 2023

Before :

**THE HON MR JUSTICE MELLOR**

-----  
Between :

(1) DR CRAIG STEVEN WRIGHT  
(2) WRIGHT INTERNATIONAL INVESTMENTS  
LIMITED  
(3) WRIGHT INTERNATIONAL INVESTMENTS UK  
LIMITED

**Claimants**

- and -

(1) BTC CORE (A PARTNERSHIP OF  
ENTITIES AND INDIVIDUALS  
INCLUDING THE SECOND TO TWENTY-  
SIXTH DEFENDANTS)  
(2) WLADIMIR JASPER VAN DER LAAN  
(3) JONAS SCHNELLI  
(4) PIETER WUILLE  
(5) MARCO PATRICK FALKE  
(6) SAMUEL DOBSON  
(7) MICHAEL ROHAN FORD  
(8) CORY FIELDS  
(9) GEORGE MICHAEL DOMBROWSKI  
(A.K.A. 'LUKE DASHJR')  
(10) MATTHEW GREGORY CORALLO  
(11) PETER TODD  
(12) GREGORY FULTON MAXWELL  
(13) ERIC LOMBROZO  
(14) JOHN NEWBERY  
(15) PETER JOHN BUSHNELL  
(16) BLOCK, INC.  
(17) SPIRAL BTC, INC.  
(18) SQUARE UP EUROPE LTD  
(19) BLOCKSTREAM CORPORATION INC.  
(20) CHAINCODE LABS, INC

**Defendants**

- (21) COINBASE GLOBAL INC.
- (22) CB PAYMENTS, LTD
- (23) COINBASE EUROPE LIMITED
- (24) COINBASE INC.
- (25) CRYPTO OPEN PATENT ALLIANCE
- (26) SQUAREUP INTERNATIONAL LIMITED

-----  
-----

**Michael Hicks** (instructed by **Harcus Parker Limited**) for the **Claimants**  
**The Defendants were neither present nor represented**

Hearing date: 3<sup>rd</sup> February 2023

-----

### **Approved Judgment**

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

Remote hand-down: This judgment will be handed down remotely by circulation to the parties or their representatives by email and release to The National Archives. A copy of the judgment in final form as handed down should be available on The National Archives website shortly thereafter but can otherwise be obtained on request by email to the Judicial Office ([press.enquiries@judiciary.uk](mailto:press.enquiries@judiciary.uk)). The deemed time and date of hand down is 10 am on Tuesday 7<sup>th</sup> February 2023.

.....

THE HON MR JUSTICE MELLOR

**Mr Justice Mellor :**

1. This judgment is concerned with a short, discrete but important point about whether copyright subsists in a file format used in the Bitcoin System. Unfortunately, there is a lot of background and context I must set out before I get to the short point in question.

**Background**

2. The First Claimant, Dr Wright, claims to be the creator of the Bitcoin System, the person who wrote the original Bitcoin code and the author of the White Paper, a document entitled *Bitcoin: A Peer-to-Peer Electronic Cash System*, which essentially describes the Bitcoin System. He claims he was the person who made the White Paper available to the public on 31 October 2008 under the pseudonym *Satoshi Nakamoto*.
3. This action is one of four in the Business & Property Courts involving Dr Wright and there is a common issue in all four actions – what has been called ‘the identity issue’, namely, whether it was Dr Wright who adopted the pseudonym *Satoshi Nakamoto* when announcing his creation of the Bitcoin System or, perhaps slightly inaccurately, whether Dr Wright was or is *Satoshi Nakamoto*. That issue will be the subject of trial in due course.
4. The hearing which gave rise to this judgment was concerned with an aspect of Dr Wright’s application for permission to serve this claim out of the jurisdiction. Some of the Defendants are in the jurisdiction and have been served already in a conventional way. The majority of the Defendants are outside the jurisdiction. There is clear authority that, in order to grant a litigant permission to serve his claim on someone outside the jurisdiction, the court must be satisfied that there is a serious issue to be tried on the merits of the claim see *Altimo Holdings and Investment Ltd v Kyrgyz Mobile Tel Ltd* [2011] UKPC 7 at [71], *VTB Capital Plc v Nutritek International Corp* [2013] UKSC 5 at [164]. This means that the claim must have a real (as opposed to a fanciful) prospect of success. This standard applies to each cause of action asserted in the claim.

**How the issue arose and how it developed**

5. The application for permission to serve out came before me to determine on the papers. Having considered all the material, I was satisfied I should grant permission to serve out on the claims asserted in the draft Amended Particulars of Claim with one exception. This concerned the claim of subsistence and infringement of copyright in an alleged literary work referred to as the Bitcoin File Format. I therefore requested the Claimants to file a short skeleton argument and/or further evidence to address this point: ‘*When and in what form the alleged literary work in the Bitcoin File Format was first recorded, in writing or otherwise.*’ I was raising the issue of fixation.
6. The Second Witness Statement of Dr Wright was filed to address this point, and he did so in the following paragraphs:

‘4. I devised and created the Bitcoin File Format in the course of writing the code for the Bitcoin System. When the software runs and the hashing problem is solved, the software creates blocks in the Bitcoin File Format which are added to the Bitcoin Blockchain file.

5. The first block in the Bitcoin Blockchain is a special block known as the “Genesis Block”. I ran the Bitcoin Software on 3 January 2009 (GMT) and created the Genesis Block on that day. It includes the words "The Times 03/Jan/2009 Chancellor on brink of second bailout for banks". (These words are not part of the file format but are simply some of the contents of the Genesis Block). The “Genesis Block” is an anchor value which is unique to Bitcoin.

6. There were issues with the software which took me some days to correct. The second block (now known as Block #1) which is the first “mined” block in the Blockchain was not created until I ran the software on 9 January 2009 (GMT).

7. Therefore, the Bitcoin File Format in the form which is on the Bitcoin Blockchain was first recorded on 3 January 2009 (GMT) when the software was run as I have described above. The recording was in electronic form on the Bitcoin Blockchain.’

7. In [8] Dr Wright describes how, over 2007 to 2009, there were earlier pre-release versions of the software and file format created in the course of his development – entirely to be expected. He concludes [8] with this:

‘When these earlier pre-release versions were run as with the version released in January 2009, they would write a block to file. This would have made a record in electronic form of the Bitcoin File Format in the form it stood at the time.’

8. All this evidence says is that blocks were written to file in the Bitcoin File Format, i.e. the data in a block was stored according to the structure explained in Schedule 2 to the Particulars of Claim (see further below). It does not address the issue of fixation: where was this structure fixed in a material form.
9. On the basis of those materials, I formed the view that there was no serious issue to be tried. I asked my clerk to communicate a message to this effect to the Claimant’s solicitors, indicating that if the Claimants wished to address this point further, a short oral hearing would be appointed. This resulted in the hearing last Friday.
10. As part of the preparation for the hearing, the Claimants’ solicitors asked for an indication of what I would find helpful to cover. My response sent to them was as follows:

‘The alleged literary copyright work is said to be the Bitcoin File Format, as explained in Schedule 2. Paragraph 57 of the Particulars of Claim seems to indicate that the Bitcoin File Format was first recorded in the early blocks of the Blockchain.

However, as the Judge understands the position, each block simply comprises a long list of hex characters. The ‘structure’ derives from what the software is instructed (in its code) to read and process when it reads a block. So the software reads the first

80 bytes and processes those as constituting the header. Those 80 bytes can then be ‘read’ by reference to the structure set out in paragraph 3 of Schedule 2, so the first 4 bytes are processed as constituting the nVersion field and so on. But again, the structure of the block header derives from what the software is instructed to read and process. It is not indicated in the block itself.

Hence the questions:

- 1) Is the above understanding broadly correct? If erroneous, please explain in what respects.
  - 2) Where, in one of the early blocks, is it possible to discern the structure which is now claimed to be the copyright work;
  - 3) In what sense is the structure (as discernible in one of the early blocks) reproduced in later blocks?’
11. With the benefit of hindsight, my last two questions are capable of creating something of a red herring, because with the benefit of an understanding of the software and what it reads and writes and possibly by studying many blocks, it is possible to discern the structure of a block. In the course of the hearing, Mr Hicks offered to file further evidence comprising extracts from various books on Bitcoin which show that several people have worked out the structure of a block. I indicated that was not necessary, since I entirely accept that people have been able to work out the structure of a block.
  12. Prior to the hearing I received a helpful Skeleton Argument from Mr Hicks along with a very useful bundle of authorities.
  13. I make clear that for the purpose of determining whether I should grant permission to serve out, I have proceeded on the assumption that everything said by Dr Wright is true (including his claim to be the creator of the Bitcoin System) and, furthermore, that all the allegations of fact contained in the draft Amended Particulars of Claim are true. All allegations which reach that stage will be tested at trial.

### **The underlying claim**

14. In this action, Dr Wright claims to be the owner of certain database rights which he says subsist in three databases, namely (i) the Bitcoin Blockchain, (ii) the Bitcoin Blockchain as it stood on 1 August 2017 at 14.11 – up to and including block 478,558 and (iii) another part of the Bitcoin Blockchain made in a particular period (the details of which do not matter for present purposes). Dr Wright also says he (or one of the Claimants) owns the copyright which subsist in (a) the White Paper and (b) what is called in the Particulars of Claim ‘the Bitcoin File File Format’.
15. Dr Wright brings this claim because he objects to two ‘Airdrops’, each of which effected what he terms ‘significant’ changes to his Bitcoin System and which deviated from the principles and protocols he had created and specified. The first Airdrop occurred on 1 August 2017 and resulted in what Dr Wright calls the BTC Network. Nodes on the Bitcoin Network continued to operate the existing Bitcoin System but the

Airdrop effectively created a branch in the chain, so that from block 478,558, the Bitcoin Blockchain continued adding blocks mined by its nodes thereby extending the Bitcoin Blockchain, with the BTC Blockchain running in parallel. The ticker 'BTC' has been adopted for the digital cash system operated by the BTC Network.

16. The second Airdrop occurred on 15 November 2018 and created another new peer-to-peer network (the 'current BCH Network'), again which Dr Wright says implemented significant changes to his Bitcoin System. So from that date another parallel blockchain emerged, this called the BCH Blockchain. The ticker BCH is used for the digital cash system operated by the BCH Network.
17. Although Dr Wright says he did not coin the ticker BSV (Bitcoin Satoshi Vision), it is now used to designate the original Bitcoin digital cash system.
18. Dr Wright's case is that the database rights and copyrights which he/the Claimants own provide a mechanism by which he can prevent the further operation of the BTC Blockchain and the BCH Blockchain without his consent.
19. Both the BTC Blockchain and the BCH Blockchain contain the Bitcoin Blockchain up to and including block 478,558. Dr Wright's claim is that the operation of the BTC Blockchain and the BCH Blockchain result in the extraction and/or re-utilisation of all or substantial parts of the Databases in which he owns database right.
20. The White Paper is included in block 230,009 of the Bitcoin Blockchain. There is no difficulty in literary copyright subsisting in the White Paper. The consequence is that use of the BTC Blockchain and the BCH Blockchain entails reproduction of block 230,009 and reproduction of the entire White Paper, all done, so Dr Wright alleges, without the consent of him as the copyright owner.
21. I was and am satisfied that the claims in database right and of infringement of copyright in the White Paper raise serious issues to be tried and therefore service out of the jurisdiction of those claims should be permitted. The issue addressed in this Judgment is whether there is a serious issue to be tried regarding the allegations concerning the Bitcoin File Format.

### **The Bitcoin File Format**

22. There is no doubt as to what the Bitcoin File Format is. It is described in Schedule 2 to the Particulars of Claim. The overall structure of a block comprises three parts: 1) a block header of 80 bytes; (2) the vtx number, of 1-9 bytes, which records the number of transactions in a variable *VarInt*; and (3) the transactions recorded in the block, of variable size.
23. The block header is always 80 bytes but Schedule 2 explains that it comprises various data fields as follows:
  - i) nVersion, 4 bytes in length comprising a 32 bit unsigned integer stored in little endian and representing the version of the block format;

- ii) hashPrevBlock, 32 bytes in length, being a double hash of the previous block header stored in little endian – essentially the link to the previous block in the chain;
  - iii) hashMerkleRoot, again 32 bytes in length, comprising a double hash of the root of the Merkle tree of transactions stored in little endian;
  - iv) nTime, a 4 byte field, representing the time in seconds since 1 Jan 1970, in a 32 but unsigned integer in little endian;
  - v) nBits, a 4 byte field recording a measure of the difficulty target in compact format;
  - vi) nNonce, a 4 byte field. Nonce is a portmanteau of ‘number used only once’. The Nonce is used in the proof of work algorithm and is effectively the number that blockchain miners are solving for.
24. Schedule 2 goes on to describe the Transactions part of the block. There are two types: normal and ‘coinbase’ transactions. Further paragraphs in Schedule 2 explain the general structure of a transaction, the structure of an input and an output in a normal transaction (which differ) and the structure of the input in a coinbase transaction (the output having the same structure), in a similar manner to the explanation of the additional structure in the header, which I summarised above. It is not necessary for me to set out these structures.

### **Copyright**

25. The starting point is section 3 of the Copyright Designs and Patents Act 1988 (as amended) which provides as follows (and has done at all material times):

‘3 Literary, dramatic and musical works

(1) In this Part—

“literary work” means any work, other than a dramatic or musical work, which is written, spoken or sung, and accordingly includes—

(a) a table or compilation, and

(b) a computer program;

....

(2) Copyright does not subsist in a literary, .... work unless and until it is recorded, in writing or otherwise; and references in this Part to the time at which such a work is made are to the time at which it is so recorded.

(3) It is immaterial for the purposes of subsection (2) whether the work is recorded by or with the permission of the author; and where it is not recorded by the author, nothing in that subsection

affects the question whether copyright subsists in the record as distinct from the work recorded.

26. Section 3(2) embodies the important concept of fixation. The principle of fixation is of general application and is referred to in both the Berne Convention and in the Rome Convention. However, as is clearly explained in the 18<sup>th</sup> Edition of *Copinger and Skone James on Copyright* at 3-36 and 3-161, it is necessary to address the ‘not very different’ EU requirement of sufficient identifiability, as specified by the CJEU in Case C-310/17 *Levola Hengelo BV v Smilde Foods BV* EU:C:2018:899. In that case (which was concerned with a copyright alleged to subsist in the taste of a spreadable dip containing cream cheese and fresh herbs), the CJEU ruled that for subject matter to be classified as a ‘work’ within the meaning of the InfoSoc Directive, two cumulative conditions must be satisfied. First, that the subject matter is original in the sense that it is the author’s own intellectual creation and second, only something which is the expression of the author’s own intellectual creation may be classified as a ‘work’. In [40]-[41], the CJEU explained:

‘40 Accordingly, for there to be a ‘work’ as referred to in Directive 2001/29, the subject matter protected by copyright must be expressed in a manner which makes it identifiable with sufficient precision and objectivity, even though that expression is not necessarily in permanent form.

41 That is because, first, the authorities responsible for ensuring that the exclusive rights inherent in copyright are protected must be able to identify, clearly and precisely, the subject matter so protected. The same is true for individuals, in particular economic operators, who must be able to identify, clearly and precisely, what is the subject matter of protection which third parties, especially competitors, enjoy. Secondly, the need to ensure that there is no element of subjectivity — given that it is detrimental to legal certainty — in the process of identifying the protected subject matter means that the latter must be capable of being expressed in a precise and objective manner.’

27. On the facts here, any difference between fixation and sufficient identifiability (and I am unable to identify any) seems to me to have no bearing whatsoever on my decision. However, as will be seen below, I have reminded myself of certain points which emerge from SAS No.3 at [29], namely: (i) it may be important to distinguish between the putative work on the one hand and any particular fixation of the work on the other hand; (ii) the fixation must not be confused with the work and (iii) the fact that one can identify a fixation is a necessary, but not sufficient, condition for the subsistence of copyright.
28. There is no doubt that a wide variety of subject matter can qualify as a literary work. It has long been recognised that the term ‘literary work’ includes computer software but also that, in order to constitute a ‘literary work’ the work need not be comprehensible by a human. Counsel also reminded me of the point that the categories of ‘work’ in the Copyright Designs and Patents Act 1988 may not be compatible with EU law, being capable of being too restrictive in certain cases. I do not consider that point has any



application here. Certainly, my conclusion in this judgment does not depend on categorisation.

29. In line with the indication above, for the purposes of this application I assume that Dr Wright created the Bitcoin File Format and it was the product of his own intellectual creation. As already stated, there is no doubt about the structure of a Bitcoin Block,

### **Caselaw**

30. Mr Hicks cited to me the three cases which touch upon the issue of whether copyright can subsist in a file format. For this purpose, it is important to understand what exactly is being called a 'file format'. Not all file formats are equal. Some (particularly XML file formats) contain sufficient content (and not just structure) to sustain a claim to literary copyright. Others (perhaps the majority) may not.
31. The first case is well-known: *SAS Institute Inc v World Programming Ltd*, the subject of a number of judgments and reports. In order to understand what is said in *SAS* about file formats, it is necessary to trace how the references to file formats arose. Mr Hicks took me through the various stages:
- i) First, there was the trial judgment of Arnold J., as he then was: [2010] EWHC 1829 (Ch); [2011] RPC 1, ('**SAS No.1**') in which he referred a series of questions to the CJEU of interpretation of Council Directive 91/250 (the Software Directive) and Directive 2009/24/EC (its later replacement).
  - ii) Second, there was the CJEU ruling: Case C-406/10, [2012] RPC 31. ('**SAS No.2**'). It will be seen below that the CJEU also referred to another Directive in the field of copyright: 2001/29/EC, also known as the Information Society Directive.
  - iii) Third, there was the further judgment of Arnold J. dealing with issues arising from the CJEU ruling: [2013] EWHC 69 (Ch), [2013] RPC 17. ('**SAS No.3**').
  - iv) Although there was an appeal from *SAS No.3*, it was concerned only with the main claims and did not touch upon the file format issue (or the *SAS Language* issue): [2013] EWCA Civ 1482.
32. The various claims which the Judge had to deal with in *SAS No.1* are explained in outline at [5]. They were somewhat unusual in the sense there was no claim to direct copying of *SAS*'s software. In particular, at that stage there was no direct allegation of infringement of copyright in any file format. Instead, the claims the Judge had to consider were described as follows (with the terminology adopted in the Court of Appeal to describe each one added):

'(i) A claim that WPL has copied the manuals for the *SAS System* published by *SAS Institute* ("the *SAS Manuals*") when creating *WPS* and thereby infringed the copyright in the *SAS Manuals*.' I interpolate, this was the 'Manual to Program Claim'.

'(ii) A claim that, by copying the *SAS Manuals* when creating *WPS*, WPL has indirectly copied the programs comprising the

SAS Components and thereby infringed the copyright in the SAS Components.’ Again, I interpolate, this was the ‘Program to Program Claim’.

‘(iii) A claim that WPL has used a version of the SAS System known as the Learning Edition in contravention of the terms of its licences, and thereby both acted in breach of the relevant contracts and infringed the copyright in the Learning Edition.’ This was the ‘Learning Edition Claim’.

(iv) A claim that WPL has infringed the copyright in the SAS Manuals in creating its own documentation, namely a manual (“the WPS Manual”) and some “quick reference” guides (“the WPS Guides”).’ This was the ‘Manual to Manual Claim’.

33. The case was tried by reference to a certain number of examples of alleged similarities. Example 23 concerned a SAS data file format called SAS7BDAT. As the Judge recorded at [128], under the heading ‘Use of SAS data file formats’ (with my emphasis added):

‘This category consists of example 23. This concerns a SAS data file format called SAS7BDAT. I have already commented on Professor Ivey’s evidence in relation to the data file formats in para.23 above. The example consists of “the SAS source code used to generate files in the SAS7BDAT formats” on the one hand and 15 identified routines in the WPS source code and their functions on the other hand. As presented in exhibit PAI11, example 23 appears to be an allegation of (presumably indirect) reproduction of unidentified SAS source code. That is also the flavour of Professor Ivey’s evidence in the body of his report. As stated above, however, not merely is the SAS source code unidentified, but also Professor Ivey had not even inspected the relevant source code. There is no evidence that the SAS source code sets out the SAS7BDAT format, as opposed to reading and writing files in that format.’

34. The relevant passage in [23] (where the Judge dealt with various criticisms made by WPL of Professor Ivey’s evidence) is as follows. The Judge quoted the following passage from the Professor’s report, and then made his finding:

““The SAS file formats must be detailed in the SAS source code, in order for the SAS System to be able to generate files in those formats. The whole point of the reverse engineering exercise undertaken by WPL is to replicate the operation of that SAS source code in WPS.”

That evidence was capable of seriously misleading a non-technical judge. There is in fact no evidence that the SAS source code does “detail” the relevant SAS data file formats, as opposed to reading and writing files in those formats. Professor Ivey not

only did not exhibit the relevant SAS source code to his report, but also had not even inspected it. I do not consider, however, that this means that the remainder of Professor Ivey's evidence should be rejected.'

35. In SAS No.2, the principal point addressed by the CJEU was '*whether Art.1(2) of Directive 91/250 must be interpreted as meaning that the functionality of a computer program and the programming language and the format of data files used in a computer program in order to exploit certain of its functions constitute a form of expression of that program and may, as such be protected by copyright in computer programs for the purposes of that Directive.*' This was the CJEU's re-phrasing and some might say (over-) simplification of Questions 1-5 referred by Arnold J.
36. The reference to 'the format of data files' arose from question 4 which was concerned with whether Art 1(2) of the Software Directive meant it was not an infringement of copyright in the earlier program to use the same file format in the later program.
37. Mr Hicks drew my attention to the following passages in SAS No.2. The CJEU addressed its rephrased question by citing from its ruling in Case C-393/09, *Bezpečnostní softwarová asociace—Svaz softwarové ochrany v Ministerstvo kultury* [2010] E.C.R. I-13971, a ruling which had been issued after the reference had been made, and then continued:

'38 From this the Court concluded that the source code and the object code of a computer program are forms of expression thereof which, consequently, are entitled to be protected by copyright as computer programs, by virtue of Art.1(2) of Directive 91/250. On the other hand, as regards the graphic user interface, the Court held that such an interface does not enable the reproduction of the computer program, but merely constitutes one element of that program by means of which users make use of the features of that program (*Bezpečnostní softwarová asociace*, paras.34 and 41).

39 On the basis of those considerations, it must be stated that, with regard to the elements of a computer program which are the subject of Questions 1 to 5, neither the functionality of a computer program nor the programming language and the format of data files used in a computer program in order to exploit certain of its functions constitute a form of expression of that program for the purposes of Art.1(2) of Directive 91/250.

40 As the Advocate General states in point 57 of his Opinion, to accept that the functionality of a computer program can be protected by copyright would amount to making it possible to monopolise ideas, to the detriment of technological progress and industrial development.

41 Moreover, point 3.7 of the explanatory memorandum to the Proposal for Directive 91/250 [COM (88) 816] states that the main advantage of protecting computer programs by copyright is that such protection covers only the individual expression of the work and thus leaves other

authors the desired latitude to create similar or even identical programs provided that they refrain from copying.

42 With respect to the programming language and the format of data files used in a computer program to interpret and execute application programs written by users and to read and write data in a specific format of data files, these are elements of that program by means of which users exploit certain functions of that program.

43 In that context, it should be made clear that, if a third party were to procure the part of the source code or the object code relating to the programming language or to the format of data files used in a computer program, and if that party were to create, with the aid of that code, similar elements in its own computer program, that conduct would be liable to constitute partial reproduction within the meaning of Art.4(a) of Directive 91/250.

44 As is, however, apparent from the order for reference, WPL did not have access to the source code of SAS Institute's program and did not carry out any decompilation of the object code of that program. By means of observing, studying and testing the behaviour of SAS Institute's program, WPL reproduced the functionality of that program by using the same programming language and the same format of data files.

45 The Court also points out that the finding made in para.39 of the present judgment cannot affect the possibility that the SAS language and the format of SAS Institute's data files might be protected, as works, by copyright under Directive 2001/29 if they are their author's own intellectual creation (see *Bezpečnostní softwarová asociace*, paras.44 to 46).'

38. For present purposes, this ruling says nothing more than the format of data files *might* be protected as literary works. Whether an individual file format is protectible depends on the facts.
39. In the light of SAS No.2, on the return of the case to Arnold J., SAS Institute sought to raise two new allegations based on what the CJEU had said in [45], namely, first, that the SAS Language was a work that was its author's own intellectual creation, albeit that it was fixed in the form of the SAS Components (and the SAS Manuals) and accordingly the SAS Language was protectible under the Information Society Directive even if it was not a protectible aspect of the SAS Components under the Software Directive; second, that the SAS data file formats were also independent copyright works, protectible under the Information Society Directive.
40. Noting that neither of these new allegations had been pleaded, the Judge refused permission to amend to include them. Since the reasoning regarding the SAS File Formats was linked to that concerning the SAS Language, at the risk of lengthening this judgment further, it is convenient to quote the whole relevant passage, in which the underlining represents my emphasis:

‘27 First, can a programming language such as the SAS Language be a work at all? In the light of a number of recent judgments of the CJEU, it may be arguable that it is not a fatal objection to a claim that copyright subsists in a particular work that the work is not one of the kinds of work listed in s.1(1)(a) of the Copyright, Designs and Patents 1988 and defined elsewhere in that Act. Nevertheless, it remains clear that the putative copyright work must be a literary or artistic work within the meaning of art.2(1) of the Berne Convention: see Case C-5/08, *Infopaq International A/S v Danske Dagblades Forening* [2009] E.C.R. I-6569, [2010] F.S.R. 20 at [32]–[37]. While the definition of “literary and artistic works” in art.2(1) is expansive and open-ended, it is not unlimited. For example, it is conventionally understood not to include sound recordings or broadcasts: see Ricketson and Ginsburg, *International Copyright and Neighbouring Rights: The Berne Convention and Beyond* (2nd edn, Oxford University Press, 2007), pp.505–508, 1205–1208; Goldstein and Hugenholtz, *International Copyright: Principles, Law and Practice* (3rd edn, Oxford University Press, 2012), pp.106, 158, 188–191; and Ficsor, *Guide to the Copyright and Related Rights Treaties Administered by WIPO* (WIPO, 2003), p.27. (The 1988 Act confers “copyright” on such subject matter, but as I have explained elsewhere, the right granted is a right in the signal and not in the content, and thus in effect is a neighbouring or related right.) As I explained in my first judgment at [197], it is now settled that a computer program is a literary work within art.2(1), but it does not necessarily follow that a programming language is such a work.

28 Two points can be disposed of with relatively little difficulty. The first is that, as counsel for WPL pointed out, SAS Institute’s draft amendments do not specify what type of work SAS Institute contends the SAS Language to be. I do not regard that as a fatal objection to the allowability of the amendment. In any event, I find it difficult to conceive that, if it is a work, it can be anything other than a literary work. The real question is whether it is a work at all.

29 The second point is that, as was common ground between counsel, it is important to distinguish between the putative work on the one hand and any particular fixation of the work on the other hand. The United Kingdom, in common with many other countries, takes advantage of art.2(2) of the Berne Convention and requires fixation as a condition precedent to the subsistence of copyright: see s.3(2) of the 1988 Act. In principle, the technical means by which fixation is achieved is irrelevant. Thus, as discussed above, an artistic work may be fixed in the source code of a computer program. But the fixation must not be confused with the work. A printed book is a fixation which may embody a variety of works, for example a literary work (the text) and a series of artistic works (illustrations). These different works are likely to have different authors, and hence different owners and terms of copyright. Thus the fact that one can identify a fixation is a necessary, but not a sufficient, condition for the subsistence of copyright.

30 Counsel for WPL submitted that the proposition that a programming language such as the SAS Language could be a work was a novel one which required factual investigation as well as legal analysis. I agree. An issue which was considered at trial, in particular in the expert evidence, was whether the SAS Language was a programming language at all. Having considered the evidence, I concluded that it was: see my first judgment at [47]–[56]. That evidence sheds some light on the question presently under consideration. Thus WPL’s expert Dr Worden explained in his report that it was necessary to distinguish between a language, including a programming language such as the SAS Language, and instances of it. He also explained there are two main aspects of a language: its syntax and its semantics.

31 Nevertheless, I am confident that further evidence relevant to the present issue could usefully have been adduced by the parties. I briefly described in my first judgment at [46] the manner in which the SAS System executes scripts written in the SAS Language. This is not a matter which was investigated in any detail at the trial, however. Nor was there any detailed consideration of the relationship between the SAS Language and the SAS Components other than Base SAS. Still less was there investigation of the history of the SAS Language: when, how and by whom it was created and when, how and to what extent it has evolved from its origins.

32 As an illustration of this point, counsel for WPL submitted that the SAS Language could be regarded as an abstraction from the SAS Components in a similar way as the plot of a novel can be regarded as an abstraction from the novel. Even leaving aside my general scepticism about the appropriateness of this kind of analogy when dealing with computer software (see my first judgment at [234]), I am not at all sure that the submission is factually accurate. My present understanding is that the SAS Components implement scripts written in the SAS Language. Accordingly, it is possible to deduce aspects of the SAS Language from observing the operation of the SAS Components. It does not follow that the SAS Language is an abstraction from the SAS Components. It may perhaps be more accurate to regard it as an abstraction from the SAS Manuals, but I am not sure about that either.

33 Based on the evidence which was adduced at trial, and my general understanding of the position, my provisional view is that a programming language such as the SAS Language is not capable of being a work. A dictionary and a grammar are works which describe a language. Such works record, and thereby fix, the elements of the language they describe: the meanings of its words and its syntax. It does not follow that the language is a work. Rather, the language is the material from which works (including dictionaries and grammars) may be created. The evolutionary or organic aspect of language can be left on one side for the moment, since it is clear that it is possible to create a language from scratch. Even when a language is created from scratch, however, what it amounts to is a system of rules for the generation and

recognition of meaningful statements. Programming languages such as the SAS Language are no different in this respect.

34 Counsel for SAS Institute argued that the SAS Language was an intellectual creation, and therefore it was a work. In my view that is a non sequitur. As counsel for WPL pointed out, there are many intellectual creations which are not works, such as scientific theories: see Ricketson and Ginsburg at pp. 406–407. An article or book describing a scientific theory is a literary work, but for the reasons explained above that is beside the point when it comes to the question of whether the scientific theory per se is a work. I would add that treating the scientific theory as a distinct work protectable by copyright would undermine the exclusion of the theory from protection by the copyright in the article or book mandated by art.9(2) of TRIPS and art.2 of the WIPO Copyright Treaty (as to which, see my first judgment at [204]–[205]).

35 A second issue is whether, assuming that a programming language is in principle capable of being a work, the SAS Language as it exists now is a work. Although, as I have said, the matter was not properly investigated at trial, it is my understanding that the SAS Language has evolved considerably since its origins. Rather as new words and syntactical constructions enter human languages over time, so too new features have been added to the SAS Language over time. This was not planned and there was no overall design. In those circumstances, it is doubtful whether the SAS Language would qualify as a compilation: see my first judgment at [261]. Whether it could be argued to be a (literary) work of some other type is a question upon which it is not necessary for me to express any view.

SAS data file formats

36 The position in relation to the SAS data file formats is similar to that in respect of the SAS Language. Again, counsel for SAS Institute sought to argue that the SAS data file formats were independent copyright works, relying upon the judgment of the CJEU at [45]. Again, counsel for WPL objected that no such case had been pleaded by SAS Institute, and it was too late for SAS Institute to seek to raise such a case now. As counsel for WPL pointed out, the position in relation to the SAS data file formats is, if anything, even worse than that in relation to the SAS Language, since the draft amendments proposed by SAS Institute still do not plead any case in relation to the data file formats.

37 In my judgment SAS Institute cannot advance a case that the SAS data file formats are distinct copyright works without pleading it. Even leaving aside the point that no such amendment has yet been formulated, it would not be justified to give SAS Institute permission to amend at this late stage. As with the SAS Language, this would require difficult new factual and legal issues to be investigated.

38 There was relatively little evidence about the SAS data file formats at trial. To the best of my recollection, the only format that was addressed in the evidence at trial was SAS7BDAT (see my first judgment at [128]–[129]). I do not even know what other formats, if any, SAS Institute claims that WPL has copied.

39 The question of whether a data file format such as SAS7BDAT is a work is not straightforward for similar reasons to those that I have given in relation to the SAS Language.

40 Even if it is a work, SAS Institute’s claim in respect of the data file formats raises rather more acutely the question of fixation. For the reasons given in my first judgment at [32] and [128]–[129], it has not been established that SAS7BDAT is fixed in the SAS Components. It is not clear to me that it is fixed in any of the SAS Manuals either.

41 This claim also raises the question of originality, and in particular whether a data file format is an intellectual creation. For this purpose, elements “differentiated only by their technical function” must be disregarded: see BSA at [47] (quoted in para.19 above) and [50]. What is required is something on which the author has stamped his “personal touch” through the creative choices he has made: see Case C-145/10, *Painer v Standard Verlags GmbH*, [2012] ECDR 6 at [89]–[92] and Case C-604/10, *Football Dataco Ltd v Yahoo! UK Ltd* [2012] 2 CMLR 24, [2013] F.S.R. 1 at [38]–[39]. It is open to evidence and argument as to whether data file formats such as SAS7BDAT satisfy this requirement.’

41. Mr Hicks also cited the two cases subsequent to SAS in which allegations concerning file formats have been raised. The first is *Technomed Ltd v Bluecrest Health Screening Ltd* [2017] EWHC 2142, a judgment of David Stone sitting as a Deputy Judge of the High Court. In that case the Claimant Technomed alleged that Bluecrest had infringed its database right and copyright in its ECG analysis and reporting system known as ECG Cloud. One of the many issues the Deputy Judge had to decide concerned the so-called ‘XML Format’. This was explained by the Deputy Judge as follows at [28]:

‘To enable the patient to access the results of the ECG screening, using software (“the Software”) ECG Cloud outputs an extensible mark-up language (“XML”) file with a standardised format (“the XML Format”). The XML file is then used to generate a report for distribution to the patient or general practitioner by inserting the information held in the XML Format into a template.’

42. The Judge addressed the issue of subsistence of copyright in this section, to which I have added my own underlining of key passages:

‘Does copyright subsist in the XML Format?’

103 XML is a standard computer language for defining/representing structured data in a way which is partly self-describing using natural



language terminology. It is not a data format, but a standardised abstraction which allows flexibility in the kinds of data structure which can be represented, and in the choice of terminology and layout. Because of its flexibility, it is likely that independently designed XML schemata will differ markedly, even when describing essentially the same data.

104 Technomed claims no rights in XML as a language: rather, it claims rights in data formats written in the XML language. The XML Format was created by Mr Fuller, an employee of Technomed, between 7 April 2011 and 15 January 2014. It contains text from the Classifications, the Options and the Patient Definitions as well as Traffic Light codes using an alphanumeric convention. Different versions were created over that period as improvements and adjustments were made. As noted above, Technomed's XML Format was provided by Bluecrest to Express on 20 December 2013.

105 Technomed's computer expert, Mr Dickson, undertook a comparison of Technomed's XML Format with an XML file produced by Express for Bluecrest. Mr Dickson identified 16 characteristics shared by the two files. He considered that it was "inconceivable" that a number of those shared characteristics could have arisen by coincidence. It was his evidence that those common characteristics could only be explained by one of the files being derived from the other, or both being derived from a common source.

106 As noted earlier, the computer experts who gave evidence both agreed that the defendants used the same XML schema as previously used by Technomed, and that the revised XML schema later used by the defendants was a minor revision not a fundamental redesign. Mr Dickson in his report noted that Express's derived XML schema was in use until at least 11 December 2015.

107 Ms Heal submitted, and Mr Hill accepted in his written closing submissions, that the XML Format is not entitled to protection as a computer program (citing the Court of Justice in *SAS Institute Inc v World Programming Ltd* (C-406/10) EU:C:2012:259; [2012] R.P.C. 31 and *Arnold J in SAS Institute Inc v World Programming Ltd* [2013] EWHC 69 (Ch)). But Mr Hill submitted that the XML Format is entitled to protection as a literary work, in support of which he cited Arnold J at [41] of SAS Institute. Ms Heal accepted in her written closing that the XML Format could be a literary work so long as it meets the intellectual creation test. I therefore do not need to resolve the concerns expressed by Arnold J in *SAS Institute* about fixing of a format.

108 Mr Hill submitted that the XML Format exhibits the personal stamp of its author Mr Fuller, relying on Mr Dickson's evidence where he helpfully set out in an exhibit an example of an XML file generated by ECG Cloud, and colour highlighted those parts of it which were names chosen by the scheme designer, as opposed to the actual data described by the document, and syntax element dictated by the XML standard. Mr Dickson was not cross-examined about this document. Mr Hill

submitted on this basis that the XML Format contains content—not just structure, and hence is entitled to copyright protection.

109 I accept Mr Hill’s submission. The XML Format is the product of Mr Fuller’s intellectual creation. Copyright subsists in the XML Format.’

43. It is therefore clear that copyright subsisted in the ‘XML Format’ because it contained ‘content – not just structure’. Note that the content is not the ‘text from the Classifications, the Options and the Patient Definitions’ (see [104] above) which is included in a particular XML file. Instead, it is the terminology used in definitions (self-describing using natural language terminology) of the data which are to be included. Counsel for Bluecrest’s concession that the XML Format could be a literary work was therefore an entirely realistic and correct concession.
44. The second case is *Software Solutions Ltd v 365 Health and Wellbeing Ltd* [2021] EWHC 237 IPEC, a judgment of HHJ Melissa Clarke sitting as a Judge of the High Court. Again, it was a claim for infringement of database right and copyright, this time in a computer software application development framework known as the Integrated Development Environment for Applications (‘the IDEA System’). The first application built using the IDEA System was a particular mental health application called ‘Beating the Blues’ (BtB). BtB was initially developed by the Second Claimant. The alleged infringement was BtB v5 developed by the Defendant. The Judge described the IDEA System in the following way:
- ‘2 The IDEA System was developed utilising the XML format to create/structure, validate and run applications created using the IDEA System. Three of the main components of the IDEA System can be described as follows:
- (i) the IDEA Editor, or authoring software, which allows the author-user creating an application to define the “frames” and “trees” of the application and creates XML files which conform with the XML data formats developed as part of the development of the IDEA System and referred to in the pleadings and the evidence collectively as the “XML Schema”;
- (ii) the IDEA Engine, which deciphers XML files which have been encoded according to the XML Schema, renders the results for the user, and handles the data flow between different parts of the system; and
- (iii) the IDEA Player, which processes the XML files and “plays” them according to the sequence of IDEA commands encoded within them.’
45. Although it was conceded that copyright subsisted in the XML Schema as a literary work, from the Judge’s extensive discussion of the allegations which concerned the ‘XML Schema’, it is clear that the concession was correctly made in that the ‘XML Schema’ again contained content as well as structure. See, for example, this section (my emphasis added):

‘What is the XML Schema?’

38 XML stands for Extensible Markup Language. Mr Riordan for the claimants relies on what he describes as a “good working definition” of XML provided by Mr David Stone, sitting as a Deputy Judge of the High Court, in *Technomed Ltd v Bluecrest Health Screening Ltd* [2017] EWHC 2142 (Ch); [2018] E.C.D.R. 1; [2018] F.S.R. 8 at [103]: [as quoted above]

39 I do not understand the defendants to object to this definition. Dr Young describes an XML database as a text file which holds data in a hierarchical database. He describes the main parts of an XML file as including: (i) elements, which can have sub-elements or “child elements” nested within them, in a hierarchy; (ii) attributes, which are names set to value within an element; and (iii) values, which are the application data stored or referenced within the XML file. This may be text or numerical values or may, for example, be a link or a pointer to an image, video or audio file to be played. Dr Young gives examples of an XML hierarchal database file at pages 11 and 12 of his first report.

40 Dr Young draws an important distinction, as Mr Riordan notes in his submissions, between the structural elements of an XML file, which are the elements and the attributes, and the data elements which are the values. For BTB, then, the values are (or link/point to) the author-provided content of the application.

46. In that case, the relevant *content*, so far as subsistence of literary copyright was concerned, was not the values, but what the expert Dr Young referred to as the structural elements – the elements and the attributes. In other words, the structure was defined in a material form by the elements and the attributes.
47. The conclusion that the XML Schema comprised content and not just structure is confirmed by other passages in the Judgment, including in [109], where the Judge was dealing with the issue of who owned the rights in the XML Schema. This issue turned on whether, in a 2002 Assignment, the XML Schema fell within the ‘Retained IPR’ and the related question of whether, in the related 2002 Licence, they had been merely been licensed to a company called Ultrasis, as opposed to the Defendant’s contention that the XML Schema had been assigned to Ultrasis. The 2002 Licence defined ‘Software’ as ‘the computer programs listed in the Schedule relating to the IDEA Software’. It was common ground that the XML Schema is not a computer program or object code. Yet in [109], the Judge concluded:

‘Although the XML Schema is not object code, I am satisfied on the evidence, including the expert evidence, that the unique logic elements of the XML Schema act in a way which is almost like code, and a number of the named IDEA components (including the IDEA Player) cannot be used as the licence intends without the concurrent use of the XML Schema, ...’

48. So the Judge likened the ‘unique logic elements of the XML Schema’ to code, a point which again confirms the XML Schema comprised content and not just structure.

*Counsel's submissions*

49. At one point during our tour through the authorities, I wondered whether Mr Hicks was developing a case that the Bitcoin File Format structure was defined/fixed in the Bitcoin software. What I had in mind (as I made clear in discussions with Counsel) was the instructions in the software to read (or write) the various data fields set out in a block. So, there must be code in the software which instructs the computer running that software to read, say, the first 80 bytes and to process those 80 bytes as the header, with further sub-division into the individual data fields as described in paragraph 23 above, and so on. However, Mr Hicks expressly eschewed any such case.
50. There were a number of points made in Counsel's submissions with which I have no difficulty whatsoever. Indeed, each of the following points I had already assumed in Dr Wright's favour, either explicitly or implicitly:
- i) That Dr Wright expended substantial skill and judgement in creating the Bitcoin File Format, such that the originality/intellectual creativity requirement is met – in other words I have ignored any potential issue as mentioned by Arnold J. in SAS No.3 at [41];
  - ii) That Dr Wright devised and created the Bitcoin File Format in the course of writing the code for the Bitcoin System;
  - iii) There is no reason why two works cannot be created in parallel with one another and in the course of the same creative process.
51. Where I part company with the Claimants is with the final submission: that the requirement for fixation/sufficient identifiability was met automatically when the program was run. Counsel referred to Dr Wright's second witness statement (see [4] and [7], as quoted above) and his statement that when the software runs and the hashing problem is solved, a block is created in the Bitcoin File Format – a statement which I entirely accept. Counsel then submitted: *'this is sufficient to meet the fixation/sufficient identifiability requirements.'*
52. For a number of related reasons, and on the facts here, I consider this submission is plainly incorrect. In my judgment, the Claimants have not established there is any serious issue to be tried as to subsistence of the alleged literary copyright in the Bitcoin File Format, for a number of interrelated reasons.
53. First, whilst issues in copyright can become complex, the simple and basic steps involved in any claim for infringement of literary copyright include (a) identify the alleged copyright work and (b) compare the work with the alleged infringement.
54. It remains the case that no relevant 'work' has been identified containing content which defines the structure of the Bitcoin File Format. Of course, Schedule 2 to the Particulars of Claim comprises content defining the structure of the Bitcoin File Format, but that is not a relevant 'work'. Schedule 2 was created for the purposes of this claim and cannot form part of the causative chain between what Dr Wright devised, an alleged copyright 'work' and the alleged infringements which were being created as from 1<sup>st</sup> August 2017.

55. Second, the Claimants have now been given four opportunities to explain, in effect, what it is in the 'Bitcoin File Format', as expressed in each block, which comprises 'content and not just structure'.
56. The Claimants were presented with a possible fifth opportunity during the hearing when I asked Counsel whether, in the light of the discussion which had taken place, the Claimants wished to file any further evidence. As mentioned above, Counsel offered extracts from textbooks which show that third parties have divined the structure of a block in the Bitcoin Blockchain. As also mentioned above, I have assumed that is the case, but it does not assist the Claimants on the key issue in any way.
57. It is most revealing that, despite all these opportunities, the Claimants have not filed any evidence to the effect that a block contains content indicating the structure, as opposed to simply reflecting it. By 'content indicating the structure', I mean, by way of a crude example, a flag or symbol in the block which signals 'this is the start of the header' or 'this is the end of the header', or an equivalent of the sort of content which is found in an XML file format. Whilst I entirely accept that each block conforms to the structure described in Schedule 2 to the Particulars of Claim and is an instance or manifestation of that structure, the absence of such evidence confirms my initial view that, whether one considers the point at which the first, second or subsequent block(s) were written embodying the structure of the file format, nowhere was the structure of Bitcoin File Format fixed in a copyright sense in a material form in any of those blocks.
58. It is also highly pertinent that the Claimants did not file any evidence to the effect that my rather basic understanding of the position as regards a block (see my question 1) and the understanding set out in the quote under paragraph 10 above) was incorrect. I am driven to the conclusion there are no overt signs in a block which indicate the structure as described in Schedule 2 to the Particulars of Claim. Akin to the conclusion set out at the end of [128] in SAS No.3: there is no evidence that the Bitcoin File Format is set out in any part of the software or early blocks written to the Bitcoin Blockchain, as opposed to the Bitcoin Software simply reading and writing files in that format.
59. I also observe that it is not at all surprising that a block does not contain content (whether flags or symbols) which indicate the structure. Not only would they be unnecessary, their inclusion would also be a very inefficient use of memory.
60. Mr Hicks' final submission was to the effect that (a) the law in relation to copyright in file formats is still developing and (b) it remained arguable (and particularly so in the light of what was said in SAS No.3) that copyright did subsist in the Bitcoin File Format.
61. I do not consider that there is anything in SAS No.3 which assists the Claimants here. The pertinent point in SAS No.3 is that neither the SAS Language nor the SAS File Formats had been pleaded as alleged copyright works, so no evidence was led at the original trial to address such issues, even if some of the evidence had indirectly touched on those issues. Thus, the Judge was unable to reach a concluded view, notwithstanding the factors which he identified which caused him to doubt whether either finding was possible. The *absence* of evidence in that case does not create any relevant doubt here, where the Claimants have had ample opportunity to put forward any evidence which might support their case as to what the actual copyright work is and where and in what form it was first fixed in a material form.

62. Whilst I accept that the law of copyright will continue to face challenges with new digital technologies, I do not see any prospect of the law as currently stated and understood in the caselaw allowing copyright protection of subject-matter which is not expressed or fixed anywhere.
63. For completeness I mention two further points made by Counsel for the Claimants:
- i) At one point, Counsel was on the verge of making the submission that Arnold J. rejected in SAS No. 3 at [34], namely that because the Bitcoin File Format was an intellectual creation, it was therefore a work. This is as much a non-sequitur as it was in SAS No.3.
  - ii) Second, Counsel submitted that fixation was a pure formality, imposed so that there can be no argument later as to what the copyright work is. On that basis, he submitted, there was sufficient fixation in this case, because there is no doubt as to what the Bitcoin File Format is. This is another non-sequitur, which is also based on a complete misunderstanding of the requirement for a fixation.
64. The Claimants may consider themselves unlucky to have had their application for leave to serve out come before a Judge with at least some understanding of the technology involved here. However, since I identified the issue and have given the Claimants numerous opportunities to address it, I am unable to take what might be termed the ‘easy’ option and allow this claim to literary copyright to proceed. If, as I have found, there is no serious issue to be tried, I see no reason why any of the Defendants should be burdened with this particular claim. Counsel happened to mention that some of the Defendants might not defend the claim, giving rise to the prospect of the Claimants obtaining judgment in default against them. Again, in view of my conclusion, I see no reason why the Claimants should obtain a judgment in default on the claim for infringement of copyright in the Bitcoin File Format.
65. Accordingly, I give permission to the Claimants to serve a Re-Amended Claim Form and Amended Particulars of Claim out of the jurisdiction on the relevant Defendants on condition that the claims of and concerning infringement of copyright in the Bitcoin File Format are deleted.
66. At the conclusion of the hearing, I asked Counsel how he suggested the claim should proceed if I were to rule against the Claimants on this point. He wished to take instructions on the point. We agreed he would send a note indicating the Claimants’ position, which he did. In effect, the Claimants wish to serve the proceedings out of the jurisdiction in respect of the remaining causes of action to enable the claim to proceed. In addition, the Claimants seek permission to appeal on the basis that the issue raises ‘*a point of law concerning the requirement for fixation in this type of case on which an appeal court may take a different view and on which there appears to have been no ruling in earlier decided cases*’.
67. Consistent with my conclusion, I refuse permission to appeal. If the Court of Appeal disagrees, then the Claimants will obtain permission to appeal from that Court.