UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 6,456,994 B1
DATED : September 24, 2002
INVENTOR(S) : Tucci

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page, Item [54] and Column 1, line 1,
Correct title is -- **COMPILER FOR A QUANTUM COMPUTER** --.

Title page,
Item [56], **References Cited**, OTHER PUBLICATIONS, replace "Barrenco", by -- Barenco --.
Item [57], **ABSTRACT**
Line 1, replace "quantum hits" by -- quantum bits --.
Line 2, replace "hard-ware" by -- hardware --.
Line 6, replace "Computer" by -- computer --.

Column 1,
Line 2, insert -- REFERENCE TO A MICROFICHE APPENDIX
The present application includes a microfiche appendix comprising the C++ source code of a fully functional computer program called Qubiter1.0. Qubiter1.0 is a possible embodiment of the software of the present invention. The microfiche appendix comprises 1 microfiche with a total of 52 frames. The first frame is a test pattern for focusing. The second frame, called Appendix A, is a list of files contained in a CodeWarrior™ project for Qubiter1.0. Subsequent frames are labelled Appendix B, and comprise source code contained within said files. --.
Line 13, replace "sonic" by -- some --.
Line 62, replace period after the word "equivalently" by a comma.

Column 2,
Line 12, delete parenthesis in front of -- quantum --.
Line 61, delete parenthesis in front of -- quantum --.

Column 3,
Line 26, replace "k where" by -- where --.

Column 4,
Line 55, replace "$K_{|S|}$" by -- $k_{|S|}$ --.

Line 59, replace "$(\hat{x}.)Z_{1,N}$" by --$(\hat{x}.)_{Z_{1,N}}$--.

Line 62, replace "$(x.)\ Z_{1,4}$" by "$(x.)_{Z_{1,4}}$" and "$(\hat{x}.)Z_{1,4}$" by --$(\hat{x}.)_{Z_{1,4}}$--.

Column 5,
Line 3, replace "$(x.)\ Z_{int}$" by "$(x.)_{Z_{int}}$".

Line 4, replace "$(x.)Z_{ext}$" by "$(x.)_{Z_{ext}}$".

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Column 6,
Line 15, replace "FIG. 9" by -- FIG. 2 --.
Line 25, replace "$(x.)\Gamma_a$" by "$(x.)_{\Gamma_a}$".

Column 7,
Line 29, replace "*Ba*" by -- B_a --.

Column 8,
Equation 14, replace "a_{max} (*J*)" by -- a_{max} (*j*) --.
Line 30, replace "M_1" by -- *M* --.

Line 31, replace "$(x.)Z_{ext}$" by "$(x.)_{Z_{ext}}$".

Lines 49 and 50, replace ".The subscript was mistyped" by a comma.

Line 61, replace "m_{a_0}" by "M_{a_0}" and "M_{a-1}" by "M_{a_0-1}".

Column 9,
Line 7, replace "*da*" by -- d_a --.
Line 18, replace "vet" by -- yet --.
Line 30, replace "will will" by -- will --.
Line 39, replace "one call use" by -- one can use --.

Column 10,
Line 15, replace "Ve" by -- We --.

Column 12,
Equation 35, replace "$(x)P_a(x)P_b$" by -- $(\times)P_a(\times)P_b$ --.

Line 33, replace "$\vec{b}$" by "$\vec{\theta}$".

Equation 36, replace "*A*" in denominator by -- 4 --.
Equation 38a, replace "((" by -- (--.
Equation 39, replace "(x)" by -- $(\times)$ --.

Column 13,
Equation 44, The θ at the end of the line and the $\vec{b}$ that starts the next line should not have been split. Joined they read $\theta_{\vec{b}}$.

Line 28, replace "$A\vec{b}$" by "$A_{\vec{b}}$".

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Column 14,
Equation 52c, insert --) -- immediately after σ_z.

Line 26, replace "$\phi\vec{a}$" by "$\phi_{\vec{a}}$".
Line 57, replace "$A\vec{b}$" by "$A_{\vec{b}}$".

Line 66, Delete comma after "but".

Column 15,
Line 6, immediately after the sentence that ends: "... (a SEO) to a quantum computer", insert the following sentences: -- By a classical computer, we mean a device that makes a desired calculation using digital circuits which implement deterministic (classical, non-quantum) logic. By a quantum computer we mean a device that makes a desired calculation using an array of quantum bits (qubits). Besides their calculational circuits, classical and quantum computers may comprise input, output and memory devices. The important difference is that an array of quantum bits may be put in an entangled quantum state, whereas a digital deterministic logic circuit cannot be put in such a state (in practice, for useful periods of time). --
Line 7, replace "The classical computer is a Mac computer" by -- The classical computer of our preferred embodiment is a Mac computer --.
Line 22, replace "A preferred embodiment of the invention was written" by -- Software for a preferred embodiment of the invention was written --
Line 23, insert period immediately after "CodeWarrior^{TM}".
Line 25, immediately after "...Austin, Texas." insert the following explanatory sentences: -- C++ source code for a computer program called "Qubiterl.0" is included as a Microfiche Appendix to this document. The Microfiche Appendix has two parts: Appendix A and Appendix B. --
Line 35, replace "many hits" by -- many bits --.
Line 58, replace "CNOT a" by -- CNOT α --.
Line 61, replace "Read if" by -- Read it as --.
Line 62, replace "$\sigma_x(\beta)^{\vec{n}}(\alpha)$" by "$\sigma_x(\beta)^{\vec{n}(\alpha)}$".

Column 17,
Line 21, delete the word "speed".
Line 27, replace "Operators" by -- operators --.
Lines 40-46, replace "A product of manufacture comprised of a computer readable medium and thereon stored a method of operating a classical computer to calculate" by -- A method of operating a classical computer, wherein said method must be stored in a computer readable medium which said classical computer can read, to calculate --
Line 50, replace "a label for each node" by -- a node label for each node --
Line 54, replace "said label pair" by -- the label pair --

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 18,
Line 39, replace: "said sequences of operations" by -- said sequence of operations --
Line 47, replace: "said sequences of operations" by -- said sequence of operations --
Line 63, replace: "A product of manufacture comprised of a computer readable medium and thereon stored a method of operating a classical computer having display, storage and calculation means, to analyze" by -- A method of operating a classical computer having display, storage and calculation means , wherein said method must be stored in a computer readable medium which said classical computer can read, to analyze --

Column 19,
Line 6, replace: "a label for each" by -- a node label for each --
Line 60, replace: "said sequences of operations" by -- said sequence of operations --

Column 19, lines 49-67-Column 20, lines 1-8,
Replace: "The product of manufacture of" by -- The method of --

Column 20,
Line 8: Replace "U_{ij}**32**" by -- U_{iJ} --
Lines 17-20, replace: "A product of manufacture comprised of a computer readable medium and thereon stored a method of operating a classical computer to calculate" by -- A method of operating a classical computer, wherein said method must be stored in a computer readable medium which said classical computer can read, to calculate --
Line 25, replace: "a unitary matrix *U*" by -- a unitary matrix *U* of dimension greater than 2 --
Line 28, replace: "*U* = *LDR*" by -- *U* = *LDR,* wherein L and R each yields unitary matrices whose dimension is smaller than that of *U* --
Line 36, replace: "a sequence of operations" by -- said sequence of operations --
Line 43, replace: "a unitary matrix *U*" by -- a unitary matrix *U* of dimension greater than 2 --
Line 44, Replace "specifics" by -- specifies --.
Lines 41-56, replace: "The product of manufacture of" by -- The method of --

Column 20, lines 61-67 - Column 21, lines 1-17,
Replace: "A product of manufacture comprised of a computer readable medium and thereon stored a method of operating a classical computer to calculate" by -- A method of operating a classical computer, wherein said method must be stored in a computer readable medium which said classical computer can read, to calculate --

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Column 21,
Line 8, replace: "can he represented" by -- can be represented --
Lines 14 and 15, replace: "sequence of operations" by -- string of operations -- at the two places in lines 14 and 15 where it occurs.

Column 21, lines 18-43 - Column 22, lines 1-42,
Replace: "The product of manufacture of" by -- The method of --

Column 22,
Line 4, insert a comma immediately before the phrase: "for large N".
Line 21, replace "R_0R_1" by -- R_0, R_1 --

Signed and Sealed this

Tenth Day of February, 2004

JON W. DUDAS
Acting Director of the United States Patent and Trademark Office