1 Errata, Monday 2nd May, 2022

This document contains errata and corrections for the book. It is being updated on a regular basis. I apologize for my errors and omissions and the inconveniences they may have caused. They are my sole responsibility.

Readers are encouraged to submit their findings to the email address noted in the open-source repository (`qcc4cp@gmail.com`). Many thanks in advance for all findings and corrections!

Page 5

Equation (1.6) was typeset incorrectly. Fortunately, it is being correctly *used* in the rest of the text. The book states, incorrectly:

$$(A \otimes B)(a \otimes b) = (A \otimes a)(B \otimes b)$$

The correct form is, of course:

$$(A \otimes B)(a \otimes b) = (Aa) \otimes (Bb)$$

We use this property to apply a gate to individual qubits in a combined state. For example, to apply an X-gate to the second qubit only in a 2-qubit state, we use:

$$(I \otimes X)(\psi \otimes \phi) = (I\psi) \otimes (X\phi)$$

Page 30

The mistake from page 5 is repeated on page 30, where a copy of Equation (1.6) is presented.

1.0.1 Page 78

To compute the probability $Pr(i)$ of measuring the ith basis was incorrectly typeset as:

$$Pr(i) = \left(P_{|i\rangle}|\psi\rangle\right)^2$$

The parenthesis are incorrect. Since we compute the *norm* squared, the probability has to be written as:

$$Pr(i) = \left|P_{|i\rangle}|\psi\rangle\right|^2$$

1.0.2 Page 307

The equation at the top of the page uses the wrong symbol (`\times`) for the tensor product. It currently shows:

$$(U \times I)(I \times V) = (I \times V)(U \times I) = (U \times V)$$

but it should be (`\otimes`):

$$(U \otimes I)(I \otimes V) = (I \otimes V)(U \otimes I) = (U \otimes V)$$

Page 310

In section 8.4.8 of the book, that gate (u_3) has an error in the top right element:

$$u_3(\theta, \phi, \lambda) = \begin{bmatrix} \cos(\theta/2) & -i\sin(\theta/2) \\ e^{i\phi}\sin(\theta/2) & e^{i(\lambda+\phi)}\cos(\theta/2) \end{bmatrix}$$

The correct form would be:

$$u_3(\theta, \phi, \lambda) = \begin{bmatrix} \cos(\theta/2) & -e^{-i\lambda}\sin(\theta/2) \\ e^{i\phi}\sin(\theta/2) & e^{i(\lambda+\phi)}\cos(\theta/2) \end{bmatrix}$$