

- (51) International Patent Classification:
G06N 10/80 (2022.01)

(21) International Application Number:
PCT/SG2023/050801

(22) International Filing Date:
01 December 2023 (01.12.2023)

(25) Filing Language:
English

(26) Publication Language:
English

(30) Priority Data:
10202260326W 05 December 2022 (05.12.2022) SG

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(54) Title: SYSTEMS AND METHODS FOR PERFORMING QUANTUM COMPUTATIONS

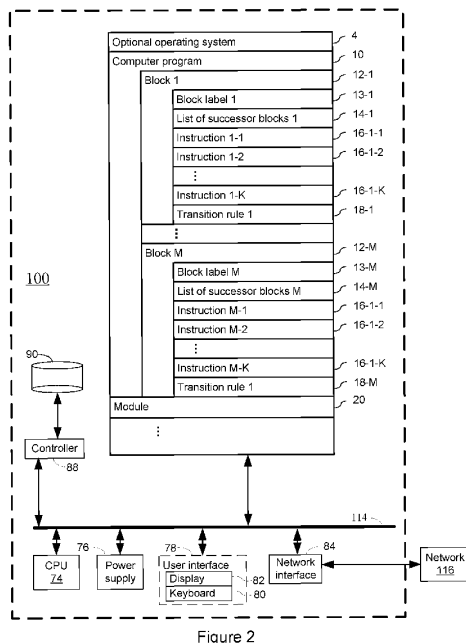


Figure 2

(57) Abstract: Computer systems and methods are provided for performing a quantum computation. The system includes digital processors, a memory, and a module. The memory includes a program expressed as blocks. Each block is associated with a transition rule that is one of HALT, ADVANCE, or BRANCH. At least one of the blocks is associated with a transition rule of BRANCH that is dependent on an outcome of a quantum operation. The module executes the blocks, and receives, from a quantum system, a corresponding outcome for each quantum operation. The module executes a first block in the blocks. If the first block is associated with the transition rule of BRANCH that is dependent on an outcome of a quantum operation, the module receives the outcome of the quantum operation in accordance with a branch of the first block, and branches to a second block or a third block, based on the outcome.

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Published:

— with international search report (Art. 21(3))