

Summary of Invention

Technical Problem

[0012] Even if the design modeling described in Patent Literature 1 or Non-Patent Literature 1 is employed, a high-order program portion which realizes the function and a low-order program portion which controls the device are closely connected to each other. Consequently, structured program design becomes difficult to perform, the software becomes complicated, and the maintainability, reusability, and expandability suffer.

It is an object of the present invention to simplify the processing structure that arbitrates contending requests.

10 Solution to Problem

[0013] A control apparatus according to an aspect of the present invention which arbitrates contending operation requests outputted from a plurality of APPs, APP standing for application program, and controls a device, includes:

a request input part which supplies, as input, the operation requests outputted from the APPs, each to a phase predetermined for a corresponding APP among a plurality of phases arranged in a fixed order;

an arbitration information storage part which stores, for each phase, arbitration information;

a request generating part which generates an operation request, being a result of arbitrating a contention of the operation requests inputted, in the phases sequentially starting with the first phase and in accordance with the arbitration information stored in the arbitration information storage part, and supplies, as input, the operation request generated, to a next phase, thereby arbitrating the contention of the operation requests step by step; and

a device control part which controls an operation of the device in accordance

with the operation request generated by the request generating part in the last phase.

[0013a] In another aspect, a control method of arbitrating contending operation requests outputted from a plurality of APPs, APP standing for application program, and controlling a device, comprising: a request input step of, with a processing device,

5 supplying, as input, the operation requests outputted from the APPs, each to a phase predetermined for a corresponding APP among a plurality of phases arranged in a fixed order; a request generating step of, with the processing device, generating an operation request, being a result of arbitrating a contention of the operation requests inputted, in the phases sequentially starting with the first phase and in accordance with arbitration
10 information stored in a storage device in advance for each phase, and supplying, as input, the operation request generated, to a next phase, thereby arbitrating the contention of the operation requests step by step; and a device control step of, with the processing device, controlling an operation of the device in accordance with the operation request generated in the request generating step in the last phase.

15 [0013b] In another aspect, a control program which arbitrates contending operation requests outputted from a plurality of APPs, APP standing for application program, and controls a device, comprising: a request input process of supplying, as input, the operation requests outputted from the APPs, each to a phase predetermined for a corresponding APP among a plurality of phases arranged in a fixed order; a request
20 generating process of generating an operation request, being a result of arbitrating a contention of the operation requests inputted, in the phases sequentially starting with the first phase and in accordance with arbitration information stored in a storage device in advance for each phase, and supplying, as input, the operation request generated, to a next phase, thereby arbitrating the contention of the operation requests step by step; and
25 a device control process of controlling an operation of the device in accordance

with the operation request generated by ~~in~~ the request generating ~~process~~part in the last phase.

Advantageous Effects of Invention

[0014] The control apparatus according to the present invention need not include a function of arbitrating contending requests in the application programs, and can separate
 5 the application programs from the function of arbitrating the contending requests. In particular, the control apparatus according to the present invention arbitrates the requests sequentially through a plurality of phase. Thus, the processing structure that arbitrates the contending requests can be simplified.

Brief Description of Drawings

10 [0015] Fig. 1 is a configuration diagram of a control apparatus 100 according to Embodiment 1.

Fig. 2 is a configuration diagram of a middleware part 20 according to Embodiment 1.

Fig. 3 is a flowchart showing the operation of the middleware part 20
 15 according to Embodiment 1.

Fig. 4 shows a case in which the control apparatus 100 is built in a refrigerator.

Fig. 5 is a table showing arbitration information concerning phase 1 according to Embodiment 1.

Fig. 6 is a table showing arbitration information concerning phase 2 according
 20 to Embodiment 1.

Fig. 7 is a configuration diagram according to Embodiment 2.

Fig. 8 is a flowchart showing the operation of a middleware part 20 according to Embodiment 2.

Fig. 9 is a table showing arbitration information concerning phase according to
 25 Embodiment 2.