

Description

Title of Invention

INFORMATION PROCESSING DEVICE, INFORMATION PROCESSING METHOD,
AND PROGRAM

Technical Field

[0001]

The present disclosure relates to an information processing device, an information processing method, and a program.

Background Art

[0002]

In recent years, for example, information processing devices capable of executing contactless communication with readers/writers (or information processing devices having reader/writer functions; the same applies below), such as cellular phones on which contactless integrated circuit (IC) cards or contactless IC chips are mounted, have been proliferated. Information processing devices such as reader/writers, IC cards, or cellular phones use, for example, magnetic fields (carrier waves) of predetermined frequencies such as 13.56 [MHz] in communication. Specifically, in communication between readers/writers and information processing devices, the readers/writers transmit carrier waves on which carrier-wave signals are loaded and the information processing devices such as IC cards receiving the carrier waves through antennas send response signals to the received carrier-wave signals through load modulation.

[0003]

In Near Field Communication (NFC) in which communication is executed using carrier waves of predetermined frequencies such as 13.56 [MHz], as described above, for example, there are various communication schemes such as “ISO/IEC 18092 Type F,” “ISO/IEC 14443 Type A,” and “ISO/IEC 14443 Type B.” Further, some information processing devices include, for example, operating systems (hereinafter referred to as “OSs” in some cases) such as dual cards corresponding to respective communication schemes to correspond to a plurality of communication schemes or communication standards.

[0004]

In such circumstances, technologies have been developed for executing processes corresponding to a plurality of communication schemes or standards normally. For example, even when a message structure in contact communication with an external device is different from a message structure in contactless communication with an external device, a technology disclosed in Patent Literature 1 can be exemplified as a technology for enabling a process corresponding to the structures of received messages. Further, for example, a technology disclosed in Patent Literature 2 can be exemplified as a technology of executing a command from an external device in an application imitating an OS operating a different execution environment from a normal environment without changing a specification of the command from the external device.

Citation List

Patent Literature

[0005]

Patent Literature 1: JP 2005-242445A

Patent Literature 2: JP 2011-118837A

Summary of Invention

Technical Problem

[0006]

As one method of causing an information processing device to correspond to a plurality of communication schemes or communication standards, for example, an information processing device includes a plurality of OSs such as “FeliCa (registered trademark) OS” and “Java Card (registered trademark) OS” as in a dual card (for example, a configuration corresponding to FIG. 1A to be described below). However, when the one method is used, a plurality of OSs have to be mounted on an information processing device.

[0007]

As another method of causing an information processing device to correspond to a plurality of communication schemes or communication standards, for example, a method in which an information processing device includes one OS and functions of OSs corresponding to communication schemes other than the communication scheme to which the OS corresponds are realized as applications can be considered (for example, a configuration corresponding to FIG. 1B to be described below). As described above, when the method of realizing functions of OSs corresponding to communication schemes other than a communication scheme to which one OS corresponds is used as an application, an information processing device can be caused to correspond to a plurality of communication schemes or communication standards despite the fact that a plurality of OSs are not mounted on the information processing device.

[0008]

However, when the functions of the OSs corresponding to the communication schemes other than the communication scheme to which the OS corresponds are realized as applications, for example, a restriction may be imposed on installation of an application (addition of an application) such as an applet since the communication schemes are different. For example, when a function of an OS, such as “ISO/IEC 18092 Type F,” corresponding to a communication scheme of managing information regarding an installed application in a table is realized by an application, for example, there is a concern that an application that a user desires to install may not be installed due to, for example, restriction (restriction on the number of recordable applications) on information regarding an application such as an applet recordable on the table.

[0009]

In embodiments of the present invention, it is desirable to provide a novel and improved information processing device, a novel and improved information processing method, and a novel and improved program capable of controlling an installed application such that a valid state and an invalid state of the application are controlled.

Solution to Problem

[0010]

According to a first aspect of the present invention, there is provided an information processing device comprising: a communication unit configured to execute contactless communication via near field communication with an external device; a storage unit configured to store applications, application information corresponding to each of the applications, and state management information ~~in which the application information is stored in association with a priority level~~; a reference unit configured to refer said application information based on designated priority level; and a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command, wherein the control unit causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

[0011]

According to a second aspect of the present invention, there is provided an information processing device comprising: a storage unit configured to store applications, application information corresponding to each of the applications, and state management information ~~in which the application information is stored in association with a priority level~~; a reference unit configured to refer said application information based on designated priority level; a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in the state management information; a communication unit configured to execute contactless communication via near field communication with an external device; and an operation unit configured to be operable by a user, wherein the control unit controls the valid state and the invalid state of the application based on a process command received from the external device by the communication unit or a process command which is based on a user's operation transmitted from the operation unit, causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

[0012]

According to a third aspect of the present invention, there is provided an information processing device comprising: a communication unit configured to execute contactless communication via near field communication with an external device; a storage unit configured to store state management information ~~in which application information is stored in association with a priority level~~; a reference unit configured to refer said application information based on designated priority level; and a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in

the state management information based on a process command, wherein the control unit causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

[0013]

According to a fourth aspect of the present invention, there is provided an information processing method comprising: a step of communicating via near field communication with an external device; a step of controlling valid states and invalid states of applications by managing, based on a process command, application information stored in state management information which is stored in a storage unit configured to store the applications, the application information corresponding to each of the applications, and the state management information ~~in which the application information is stored in association with a priority level~~; a reference step for referring said application information based on designated priority level, wherein, in the controlling step, one application is caused to enter a valid state by adding the application information corresponding to the one application to the state management information, and one application stored in the state management information is caused to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

[0014]

According to a fifth aspect of the present invention, there is provided a program for causing a computer to execute: a step of communicating via near field communication with an external device; a step of controlling valid states and invalid states of applications by managing, based on a process command, application information stored in state management information which is stored in a storage unit configured to store the applications, the application information corresponding to each of the applications, and the state management information ~~in which the application information is stored in association with a priority level~~; a reference step for referring said application information based on designated priority level, wherein, in the controlling step, one application is caused to enter a valid state by adding the application information corresponding to the one application to the state management information, and one application stored in the state management information is caused to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

According to a sixth aspect of the present invention, there is provided an information processing device comprising: a communication unit configured to execute contactless communication via near field communication with an external device, a storage unit configured to store applications, application information corresponding to each of the applications, and state management information; a reference unit configured to refer said application information based on designated priority level; and a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command,

wherein the control unit causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

According to a seventh aspect of the present invention, there is provided an information processing method comprising: a communication step for communicating via near field communication with an external device, a storage step for storing applications, application information corresponding to each of the applications, and state management information; a reference step for referring said application information based on designated priority level; and a control step for controlling a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command, wherein the control step causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

According to an eighth aspect of the present invention, there is provided a program for causing a computer to execute: a communication step for communicating via near field communication with an external device, a storage step for storing applications, application information corresponding to each of the applications, and state management information; a reference step for referring said application information based on designated priority level; and a control step for controlling a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command, wherein the control step causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

Advantageous Effects of Invention

[0015]

According to embodiments of the present invention, it is possible to control an installed application such that a valid state and an invalid state of the application are controlled.

Brief Description of Drawings

[0016]

[FIG. 1A] FIG. 1A is an explanatory diagram illustrating a process related to an information processing method in an information processing device according to an embodiment.

[FIG. 1B] FIG. 1B is an explanatory diagram illustrating a process related to an information processing method in an information processing device according to an embodiment.

CLAIMS

1. An information processing device comprising:
 - a communication unit configured to execute contactless communication via near field communication with an external device;
 - a storage unit configured to store applications, application information corresponding to each of the applications, and state management information ~~in which the application information is stored in association with a priority level~~;
 - a reference unit configured to refer said application information based on designated priority level; and
 - a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command,
 - wherein the control unit
 - causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and
 - causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

2. The information processing device according to claim 1,
 - wherein the application information includes system information used to identify a system in which the application is used, and
 - wherein, when the system information included in the application information and corresponding to an application newly set in the valid state is included in the application information already stored in the state management information, the control unit does not add the application information corresponding to the application newly set in the valid state to the state management information.

3. The information processing device according to claim 1, wherein the control unit controls a priority level associated with the application information stored in the state management information through deletion of the application information from the state management information and addition of the application information to the state management information.

4. The information processing device according to claim 1, wherein the control unit manages the applications in a first layer, and manages the application information corresponding to each of the applications and the state management information in a second layer which is lower than the first layer.
5. The information processing device according to claim 4, wherein the control unit further provides a third layer which is lower than the second layer, and manages, in the third layer, the state management information copied from the state management information managed in the second layer.
6. The information processing device according to claim 5, wherein the application information includes mode information regulating whether a response to a polling signal is given, and wherein, when the control unit updates the mode information included in the state management information, the control unit updates the mode information included in the state management information managed in the third layer but does not update the mode information included in the state management information managed in the second layer.
7. The information processing device according to claim 6, wherein the storage unit includes a volatile recording medium and a non-volatile recording medium, wherein the mode information forming the application information included in the state management information is stored in the volatile recording medium, and wherein, among information forming the application information included in the state management information, information excluding the mode information is stored in the non-volatile recording medium.
8. An information processing device comprising:
 - a storage unit configured to store applications, application information corresponding to each of the applications, and state management information ~~in which the application information is stored in association with a priority level;~~
 - a reference unit configured to refer said application information based on designated priority level;

a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in the state management information;

a communication unit configured to execute contactless communication via near field communication with an external device; and

an operation unit configured to be operable by a user,

wherein the control unit

controls the valid state and the invalid state of the application based on a process command received from the external device by the communication unit or a process command which is based on a user's operation transmitted from the operation unit,

causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and

causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

9. An information processing device comprising:

a communication unit configured to execute contactless communication via near field communication with an external device;

a storage unit configured to store state management information ~~in which application information is stored in association with a priority level;~~

a reference unit configured to refer said application information based on designated priority level; and

a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command,

wherein the control unit

causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and

causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

10. An information processing method comprising:

a step of communicating via near field communication with an external device;

a step of controlling valid states and invalid states of applications by managing, based on a process command, application information stored in state management information which is stored in a storage unit configured to store the applications, the application information corresponding to each of the applications, and the state management information ~~in which the application information is stored in association with a priority level;~~ and

a reference step for referring said application information based on designated priority level,

wherein, in the controlling step,

one application is caused to enter a valid state by adding the application information corresponding to the one application to the state management information, and

one application stored in the state management information is caused to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

11. A program for causing a computer to execute:

a step of communicating via near field communication with an external device;

a step of controlling valid states and invalid states of applications by managing, based on a process command, application information stored in state management information which is stored in a storage unit configured to store the applications, the application information corresponding to each of the applications, and the state management information ~~in which the application information is stored in association with a priority level;~~ and

a reference step for referring said application information based on designated priority level,

wherein, in the controlling step,

one application is caused to enter a valid state by adding the application information corresponding to the one application to the state management information, and

one application stored in the state management information is caused to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

12. An information processing device comprising:

a communication unit configured to execute contactless communication via near field communication with an external device,

a storage unit configured to store applications, application information corresponding to each of the applications, and state management information;

a reference unit configured to refer said application information based on designated priority level; and

a control unit configured to control a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command,

wherein the control unit causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

13. An information processing method comprising:

a communication step for communicating via near field communication with an external device,

a storage step for storing applications, application information corresponding to each of the applications, and state management information;

a reference step for referring said application information based on designated priority level; and

a control step for controlling a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command,

wherein the control step causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.

14. A program for causing a computer to execute:

a communication step for communicating via near field communication with an external device,

a storage step for storing applications, application information corresponding to each of the applications, and state management information;

a reference step for referring said application information based on designated priority level; and

a control step for controlling a valid state and an invalid state of the application by managing the application information stored in the state management information based on a process command,

wherein the control step causes one application to enter a valid state by adding the application information corresponding to the one application to the state management information, and causes one application stored in the state management information to enter an invalid state by deleting the application information corresponding to the one application from the state management information.