US 20210342104A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0342104 A1**

Lin (43) **Pub. Date: Nov. 4, 2021**

(54) **IMAGE FORMING APPARATUS AND CONTROL METHOD FOR THE SAME**

(71) Applicant: **CANON KABUSHIKI KAISHA**, Tokyo (JP)

(72) Inventor: **Zhi Lin**, Kashiwa-shi (JP)

(21) Appl. No.: **17/374,794**

(22) Filed: **Jul. 13, 2021**

Related U.S. Application Data

(63) Continuation of application No. 15/948,633, filed on Apr. 9, 2018, now Pat. No. 11,093,181.

(30) **Foreign Application Priority Data**

Apr. 17, 2017 (JP) 2017-081634

Publication Classification

(51) **Int. Cl.**

G06F 3/12 (2006.01)
H04N 1/00 (2006.01)

(52) **U.S. Cl.**

CPC ***G06F 3/1204*** (2013.01); ***G06F 3/1259*** (2013.01); ***H04N 1/00411*** (2013.01); *G06F 3/0482* (2013.01); ***G06F 3/1267*** (2013.01); ***G06F 3/1238*** (2013.01); ***G06F 3/1207*** (2013.01)

(57) **ABSTRACT**

An image forming apparatus using an image forming unit configured to form an image on a sheet and a display unit configured to display information includes at least one controller, the at least one controller configured to function as a management unit configured to manage print data in association with user information, the management unit configured to discriminably manage information about previously-printed print data and information about unprinted print data, and a unit configured to display on the display unit a user selection screen on which a plurality of selection objects corresponding to the user information is arrangeable and on which the selection object corresponding to the user information associated with the unprinted print data is arranged while no selection object corresponding to the user information associated with the previously-printed print data but not associated with the unprinted print data is arranged.

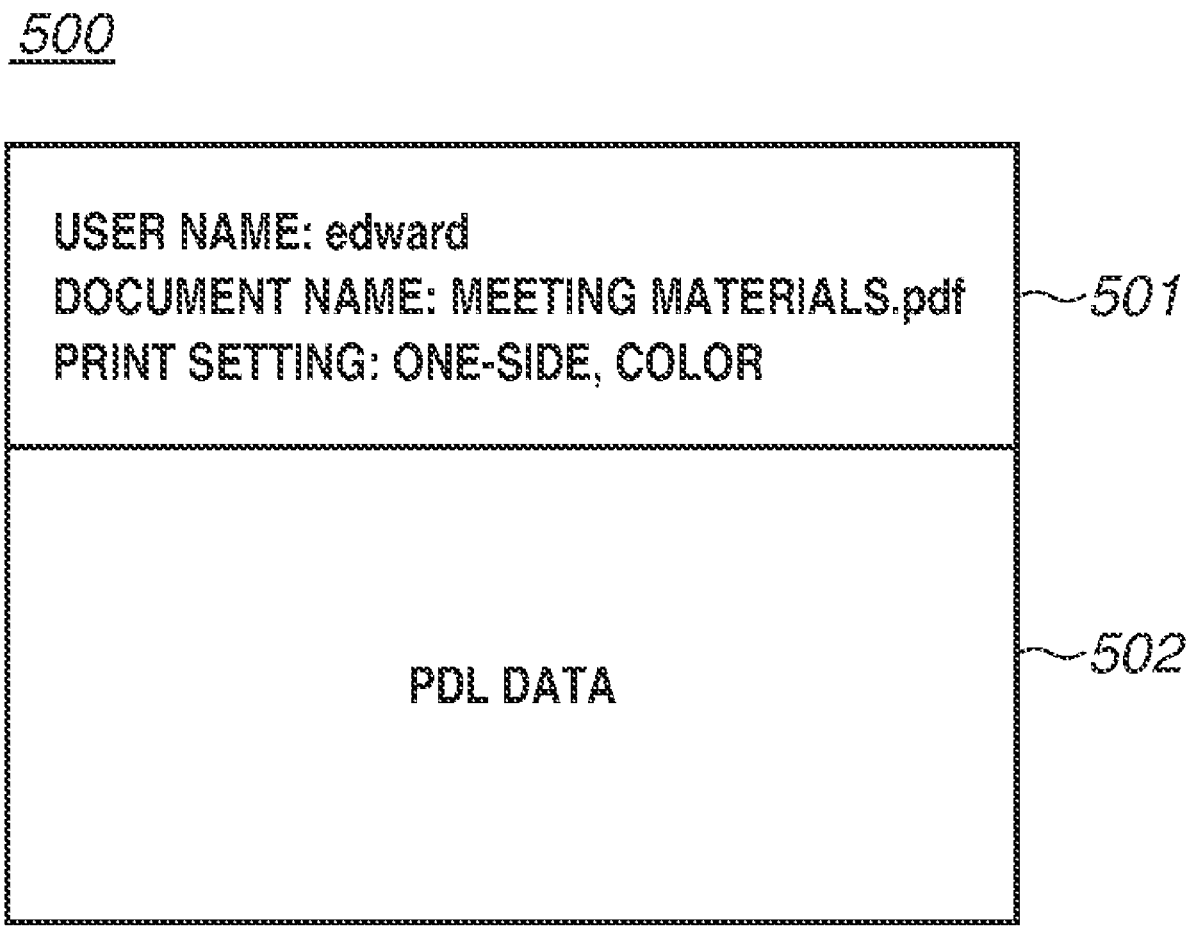

FIG.1A

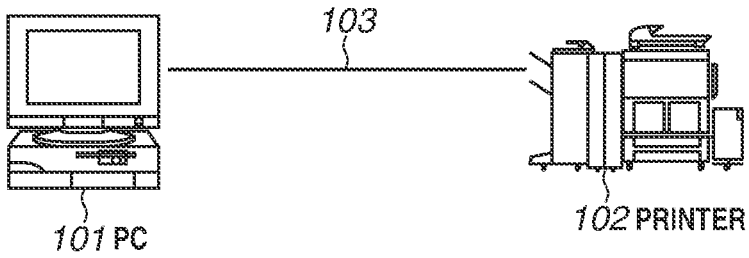
103
101 PC
102 PRINTER

FIG.1B

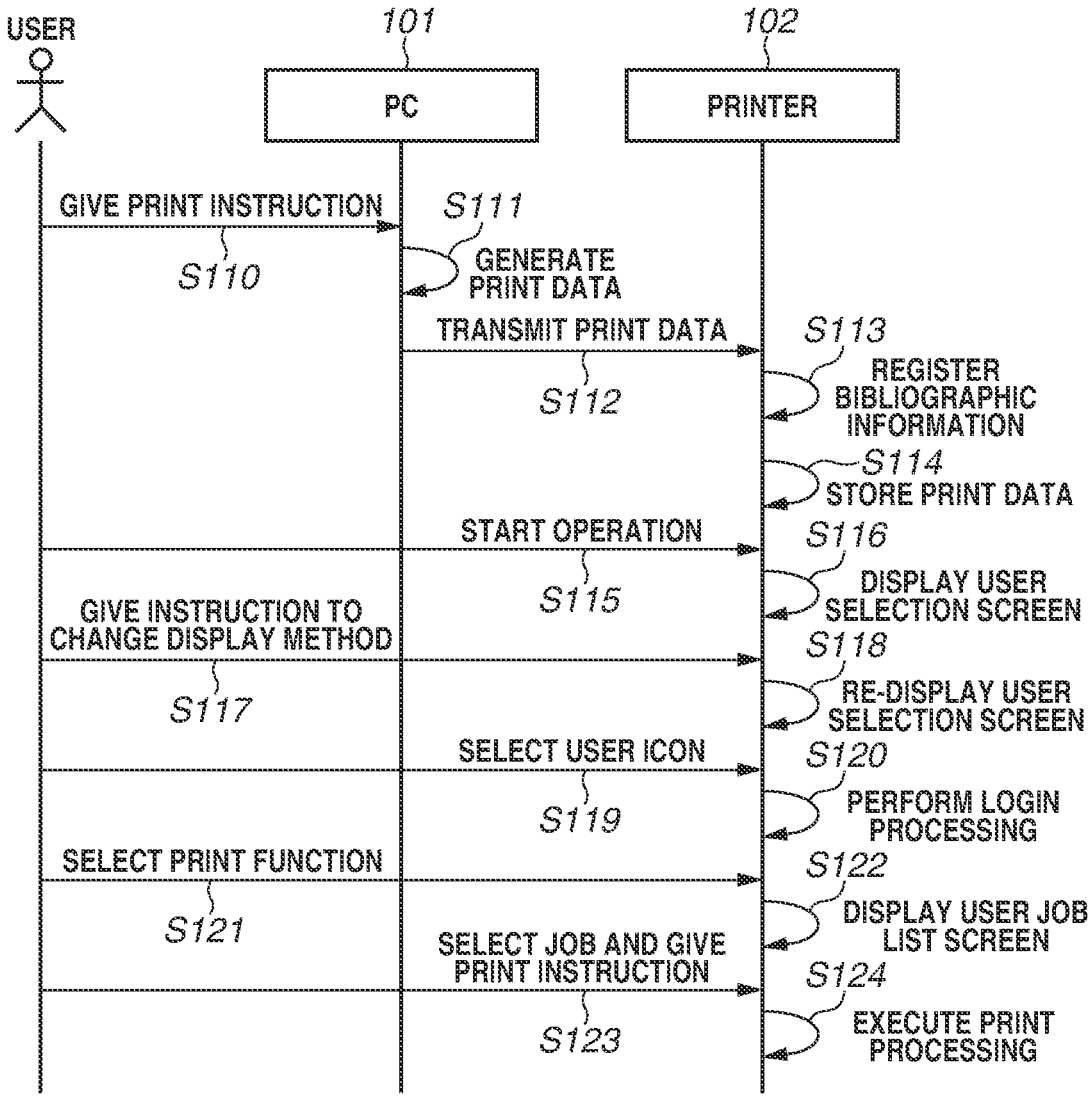
USER
101
PC
102
PRINTER
GIVE PRINT INSTRUCTION
S110
S111
GENERATE PRINT DATA
TRANSMIT PRINT DATA
S112
S113
REGISTER BIBLIOGRAPHIC INFORMATION
S114
STORE PRINT DATA
START OPERATION
S115
S116
DISPLAY USER SELECTION SCREEN
GIVE INSTRUCTION TO CHANGE DISPLAY METHOD
S117
S118
RE-DISPLAY USER SELECTION SCREEN
SELECT USER ICON
S119
S120
PERFORM LOGIN PROCESSING
SELECT PRINT FUNCTION
S121
S122
DISPLAY USER JOB LIST SCREEN
SELECT JOB AND GIVE PRINT INSTRUCTION
S123
S124
EXECUTE PRINT PROCESSING

FIG.2A

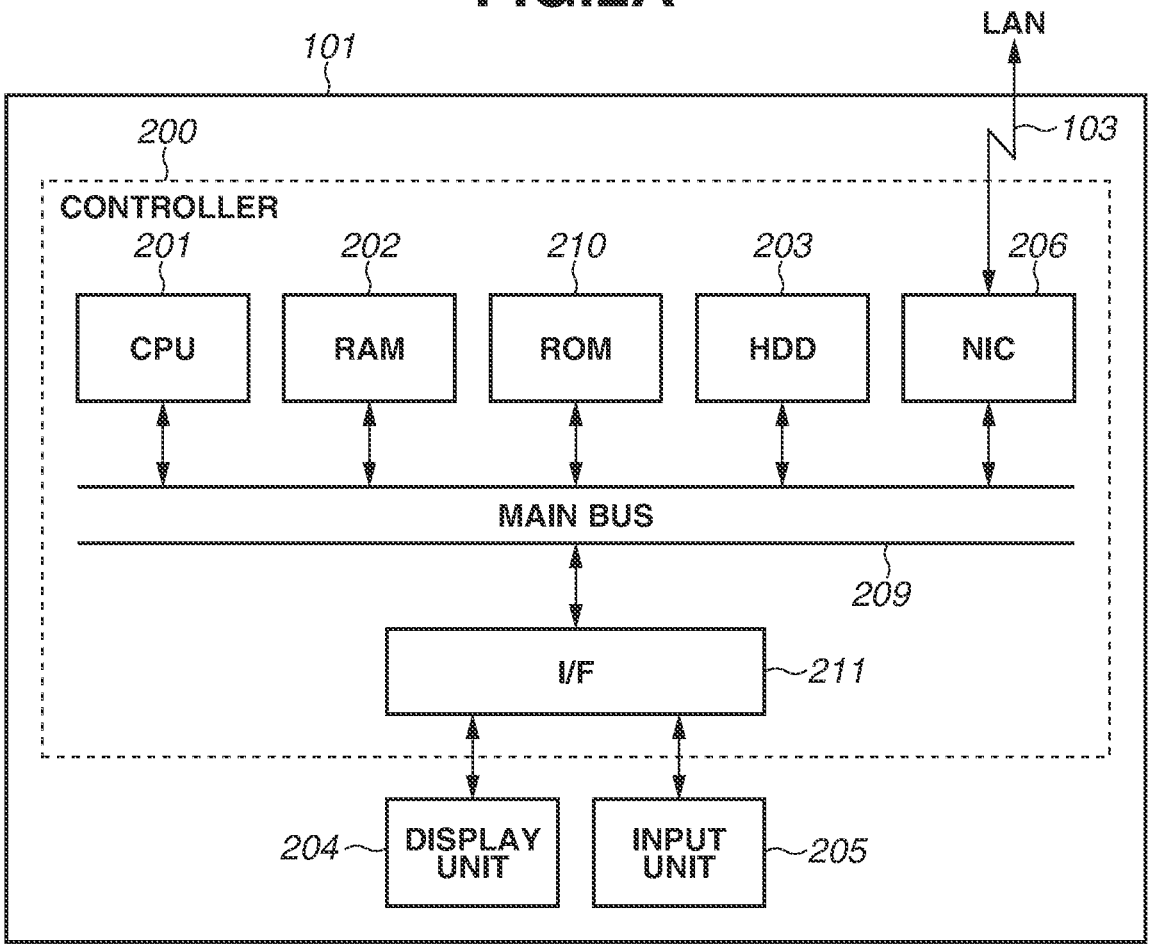
101
LAN
200
103
CONTROLLER
201
202
210
203
206
CPU
RAM
ROM
HDD
NIC
MAIN BUS
209
I/F
211
204
DISPLAY UNIT
INPUT UNIT
205

FIG.2B

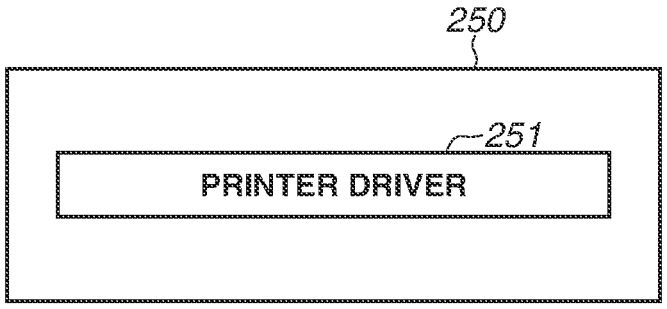
250
251
PRINTER DRIVER

FIG.3A

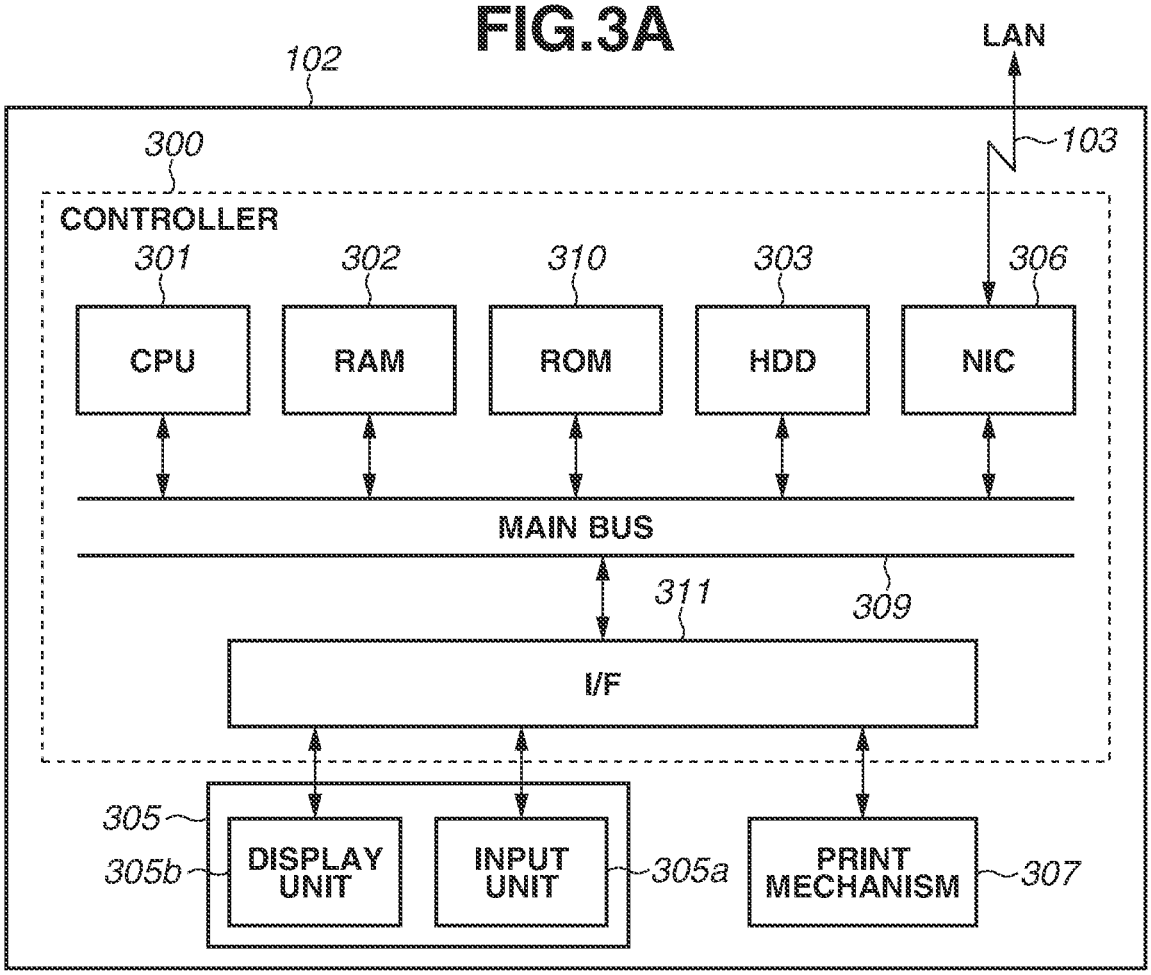
LAN
102
103
300
CONTROLLER
301
302
310
303
306
CPU
RAM
ROM
HDD
NIC
MAIN BUS
311
309
I/F
305
305b
DISPLAY UNIT
INPUT UNIT
305a
PRINT MECHANISM
307

FIG.3B

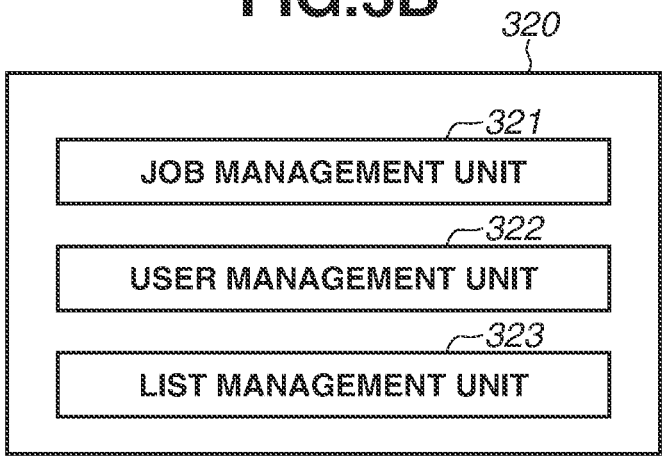
320
321
JOB MANAGEMENT UNIT
322
USER MANAGEMENT UNIT
323
LIST MANAGEMENT UNIT

FIG.4

400

No.	USER NAME	PASSWORD
0001	Administrator	****
0002	edward	****
0003	goto	****
0004	hayashi	****
0005	Ito	****
0006	ivy	****
0007	kaneko	****
. . .	. . .	. . .

500

FIG.5A

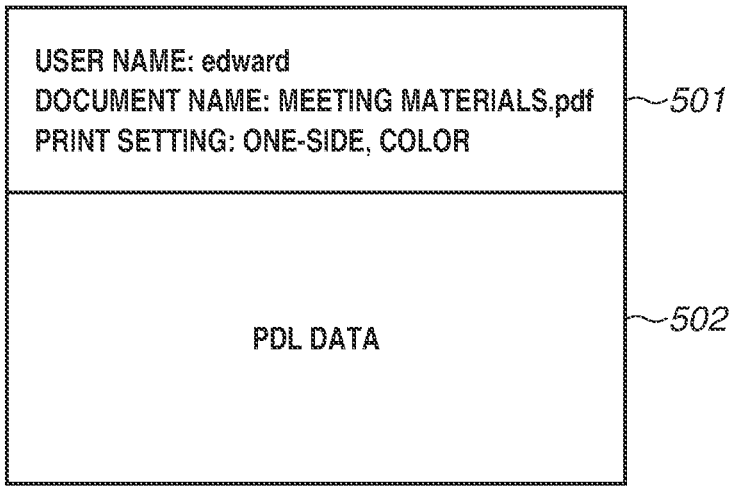

FIG.5B

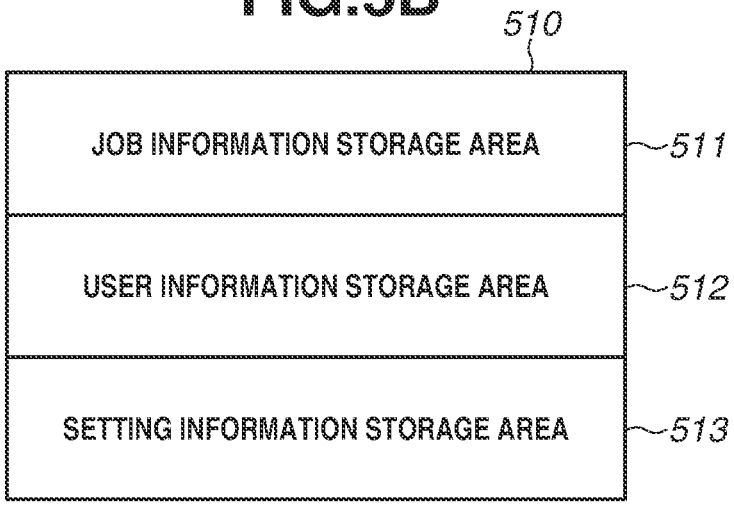

FIG.6

600

601 No.	602 JOB NAME	603 USER NAME	604 PRINT STATUS	...
0001	MEETING MATERIALS.ppt	edward	UNPRINTED	...
0002	QUOTATION.doc	edward	PREVIOUSLY-PRINTED	...
0003	SCHEDULE.xlsx	hayashi	UNPRINTED	...
0004	MINUTES.txt	goto	PREVIOUSLY-PRINTED	...
0005	MEMO.pdf	ito	UNPRINTED	...
...	...	...	...	...

FIG.7A

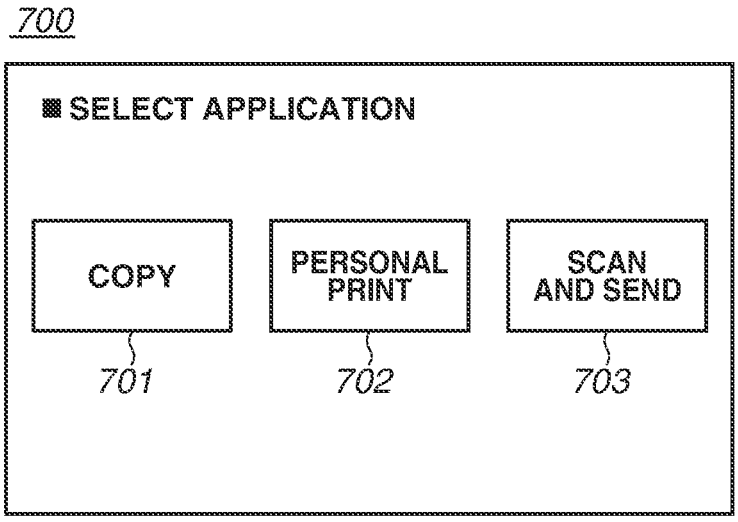

FIG.7B

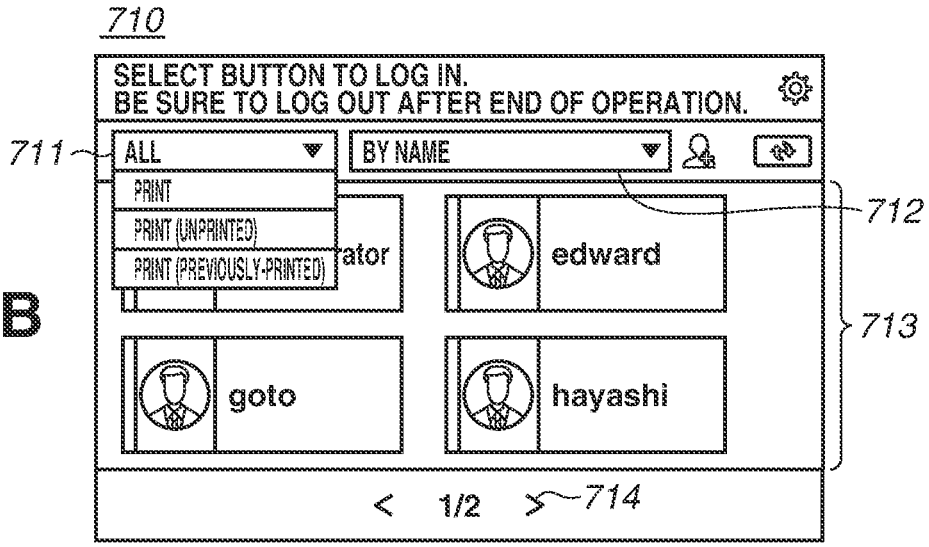

FIG.7C

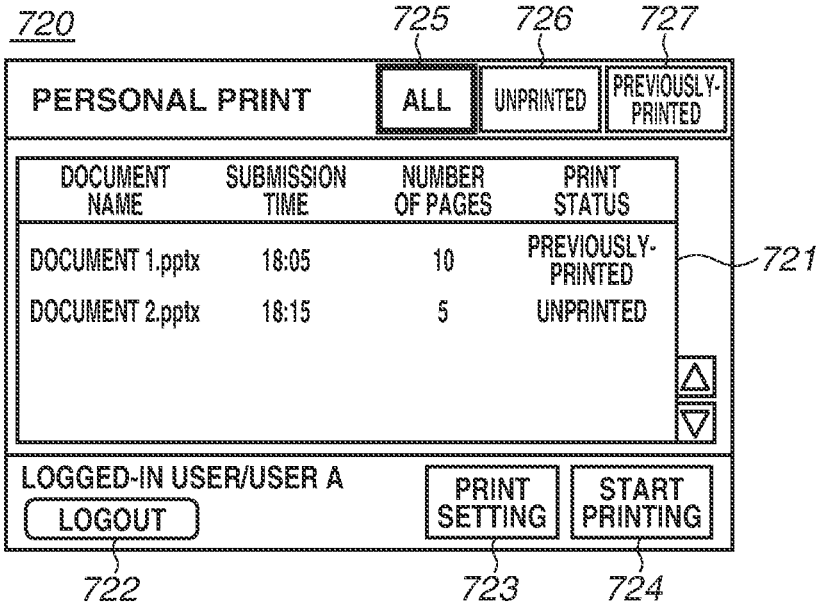

FIG.8A

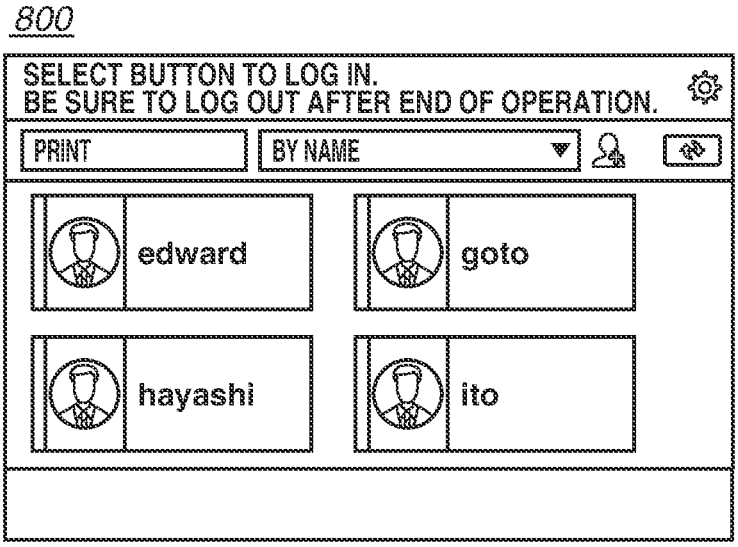

FIG.8B

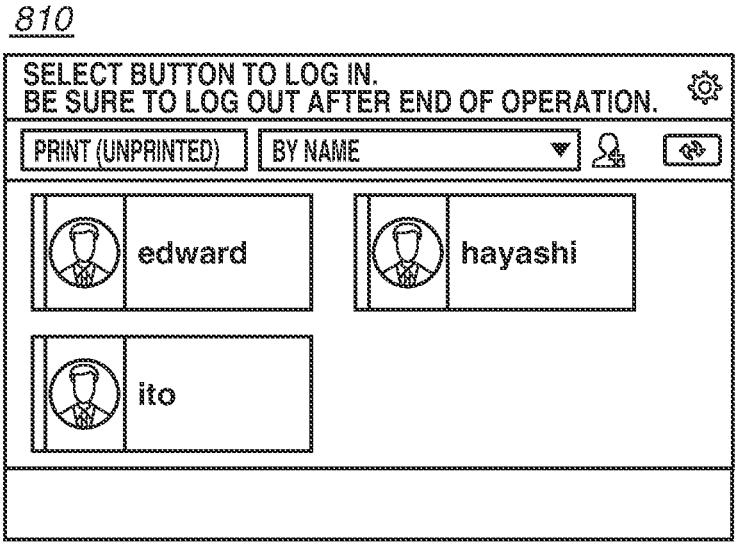

FIG.8C

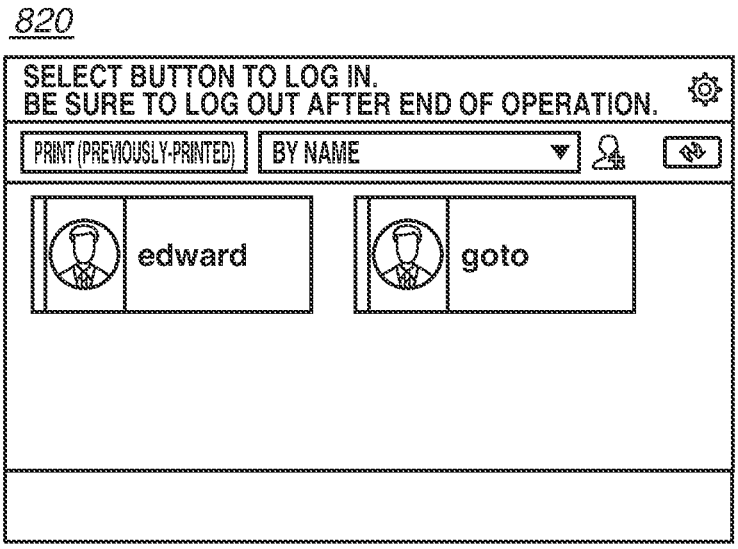

FIG.9

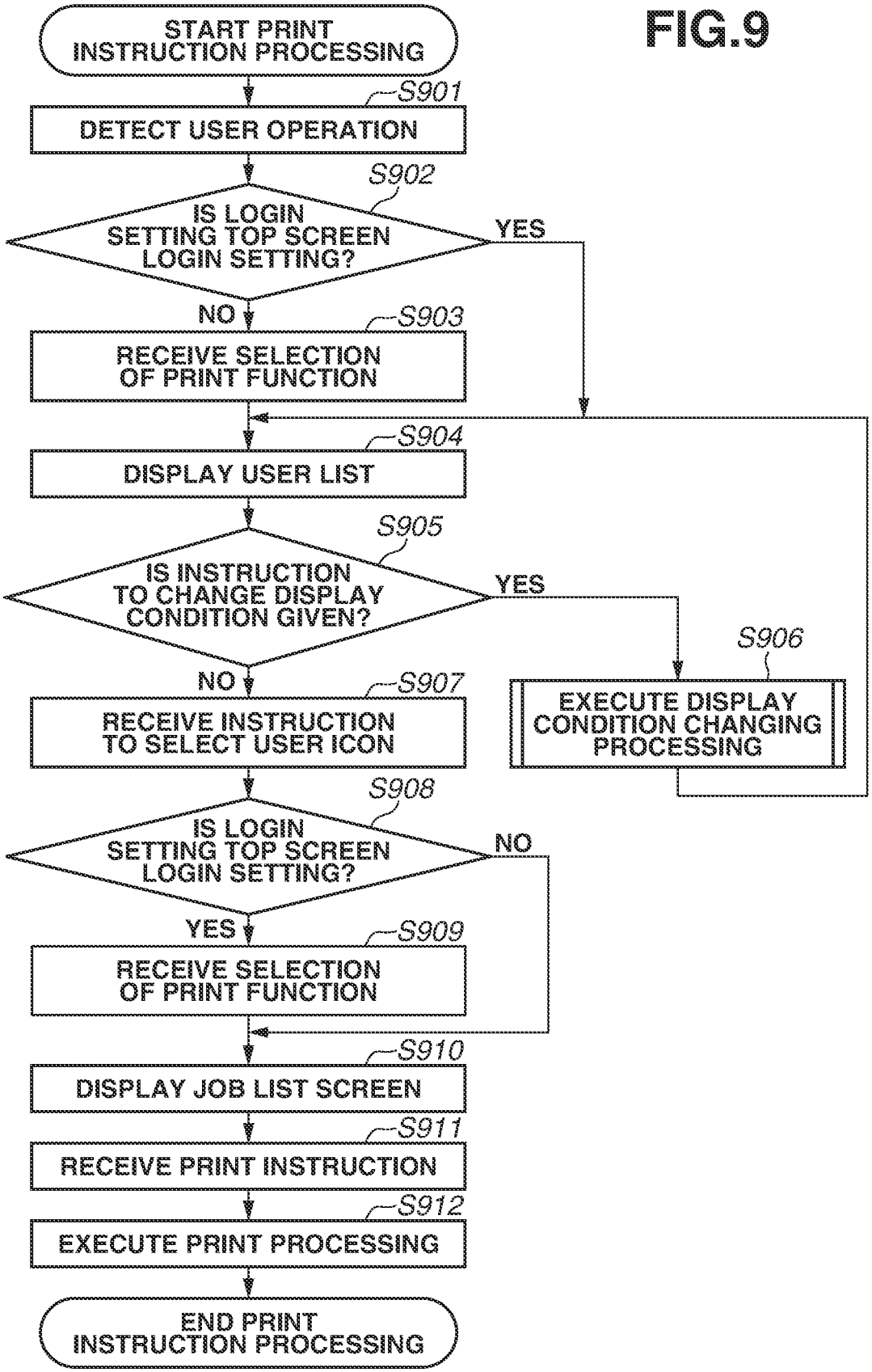
START PRINT INSTRUCTION PROCESSING
S901
DETECT USER OPERATION
S902
IS LOGIN SETTING TOP SCREEN LOGIN SETTING?
YES
NO
S903
RECEIVE SELECTION OF PRINT FUNCTION
S904
DISPLAY USER LIST
S905
IS INSTRUCTION TO CHANGE DISPLAY CONDITION GIVEN?
YES
NO
S906
EXECUTE DISPLAY CONDITION CHANGING PROCESSING
S907
RECEIVE INSTRUCTION TO SELECT USER ICON
S908
IS LOGIN SETTING TOP SCREEN LOGIN SETTING?
NO
YES
S909
RECEIVE SELECTION OF PRINT FUNCTION
S910
DISPLAY JOB LIST SCREEN
S911
RECEIVE PRINT INSTRUCTION
S912
EXECUTE PRINT PROCESSING
END PRINT INSTRUCTION PROCESSING

FIG.10

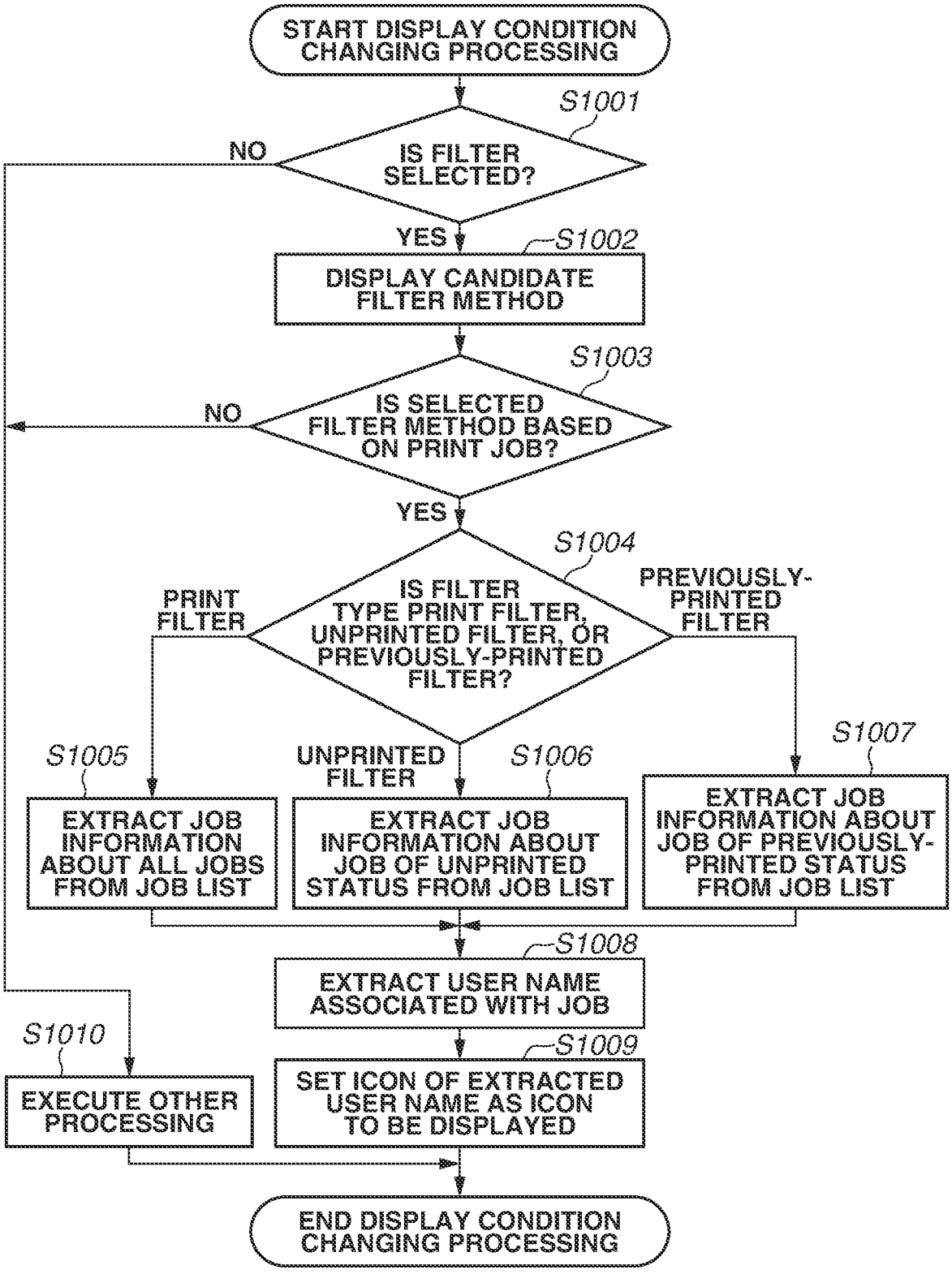
START DISPLAY CONDITION CHANGING PROCESSING
S1001
IS FILTER SELECTED?
NO
YES
S1002
DISPLAY CANDIDATE FILTER METHOD
S1003
IS SELECTED FILTER METHOD BASED ON PRINT JOB?
NO
YES
S1004
IS FILTER TYPE PRINT FILTER, UNPRINTED FILTER, OR PREVIOUSLY-PRINTED FILTER?
PRINT FILTER
UNPRINTED FILTER
PREVIOUSLY-PRINTED FILTER
S1005
EXTRACT JOB INFORMATION ABOUT ALL JOBS FROM JOB LIST
S1006
EXTRACT JOB INFORMATION ABOUT JOB OF UNPRINTED STATUS FROM JOB LIST
S1007
EXTRACT JOB INFORMATION ABOUT JOB OF PREVIOUSLY-PRINTED STATUS FROM JOB LIST
S1008
EXTRACT USER NAME ASSOCIATED WITH JOB
S1009
SET ICON OF EXTRACTED USER NAME AS ICON TO BE DISPLAYED
S1010
EXECUTE OTHER PROCESSING
END DISPLAY CONDITION CHANGING PROCESSING

FIG.11A

1110

1111 USER NAME	1112 NUMBER OF UNPRINTED JOBS	1113 NUMBER OF PREVIOUSLY-PRINTED JOBS	1114 TOTAL NUMBER OF JOBS
Administrator	0	0	0
edward	2	2	4
goto	3	7	10
hayashi	5	0	5
ito	0	8	8
. . .	. . .	. . .	. . .

FIG.11B

1120

USER NAME	NUMBER OF UNPRINTED JOBS	NUMBER OF PREVIOUSLY-PRINTED JOBS	TOTAL NUMBER OF JOBS
goto	3	7	10
ito	0	8	8
hayashi	5	0	5
edward	2	2	4
Administrator	0	0	0
. . .	. . .	. . .	. . .

FIG.12A

1210

USER NAME	NUMBER OF UNPRINTED JOBS	NUMBER OF PREVIOUSLY-PRINTED JOBS	TOTAL NUMBER OF JOBS
hayashi	5	0	5
goto	3	7	10
edward	2	2	4
ito	0	8	8
Administrator	0	0	0
. . .	. . .	. . .	. . .

FIG.12B

1220

USER NAME	NUMBER OF UNPRINTED JOBS	NUMBER OF PREVIOUSLY-PRINTED JOBS	TOTAL NUMBER OF JOBS
ito	0	8	8
goto	3	7	10
edward	2	2	4
hayashi	5	0	5
Administrator	0	0	0
. . .	. . .	. . .	. . .

FIG.13A

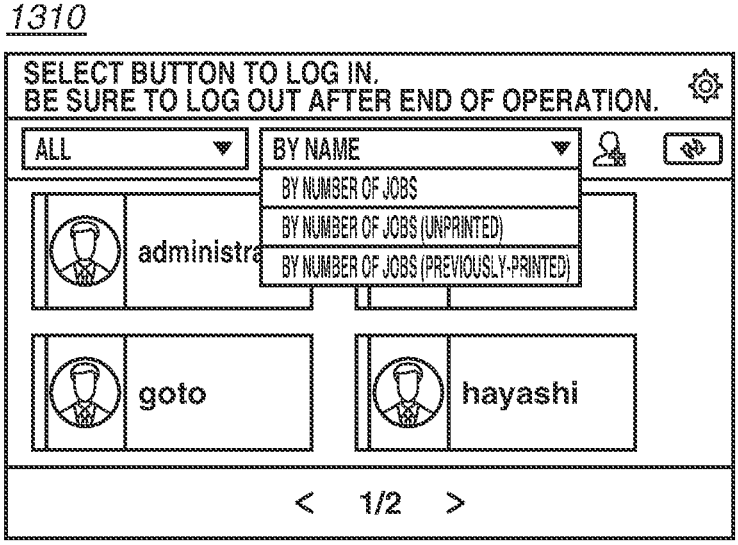

FIG.13B

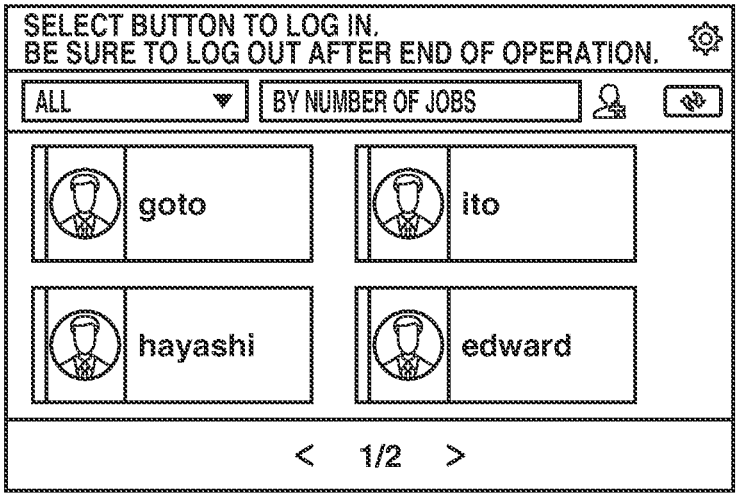

FIG.14A

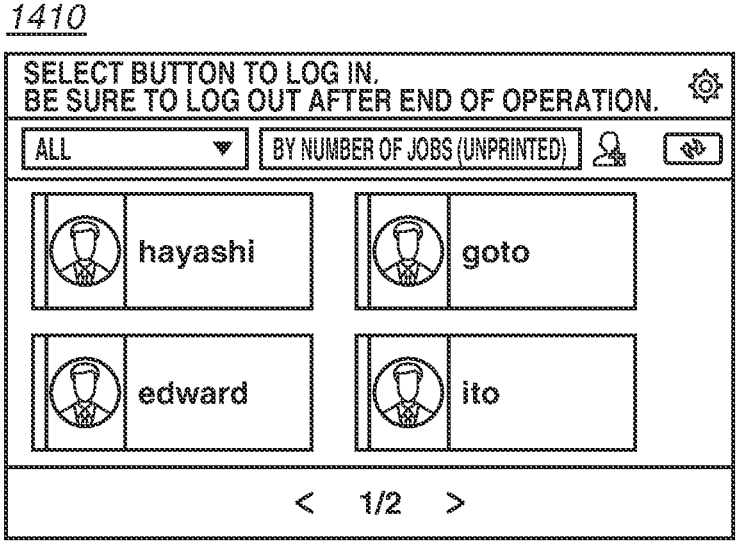

FIG.14B

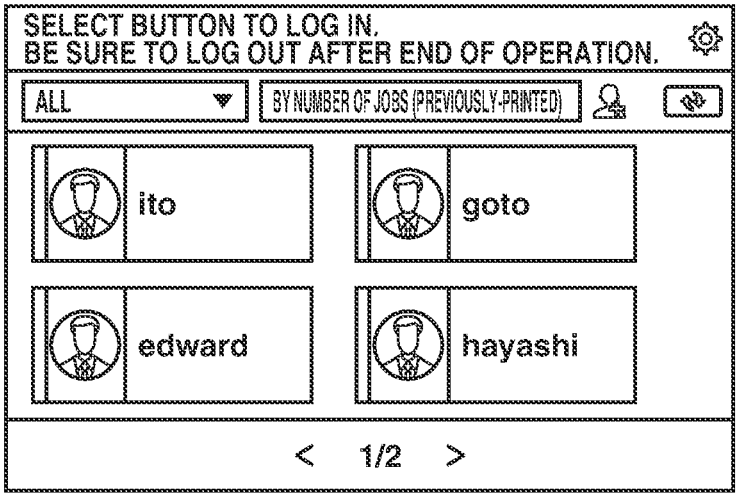

FIG.15

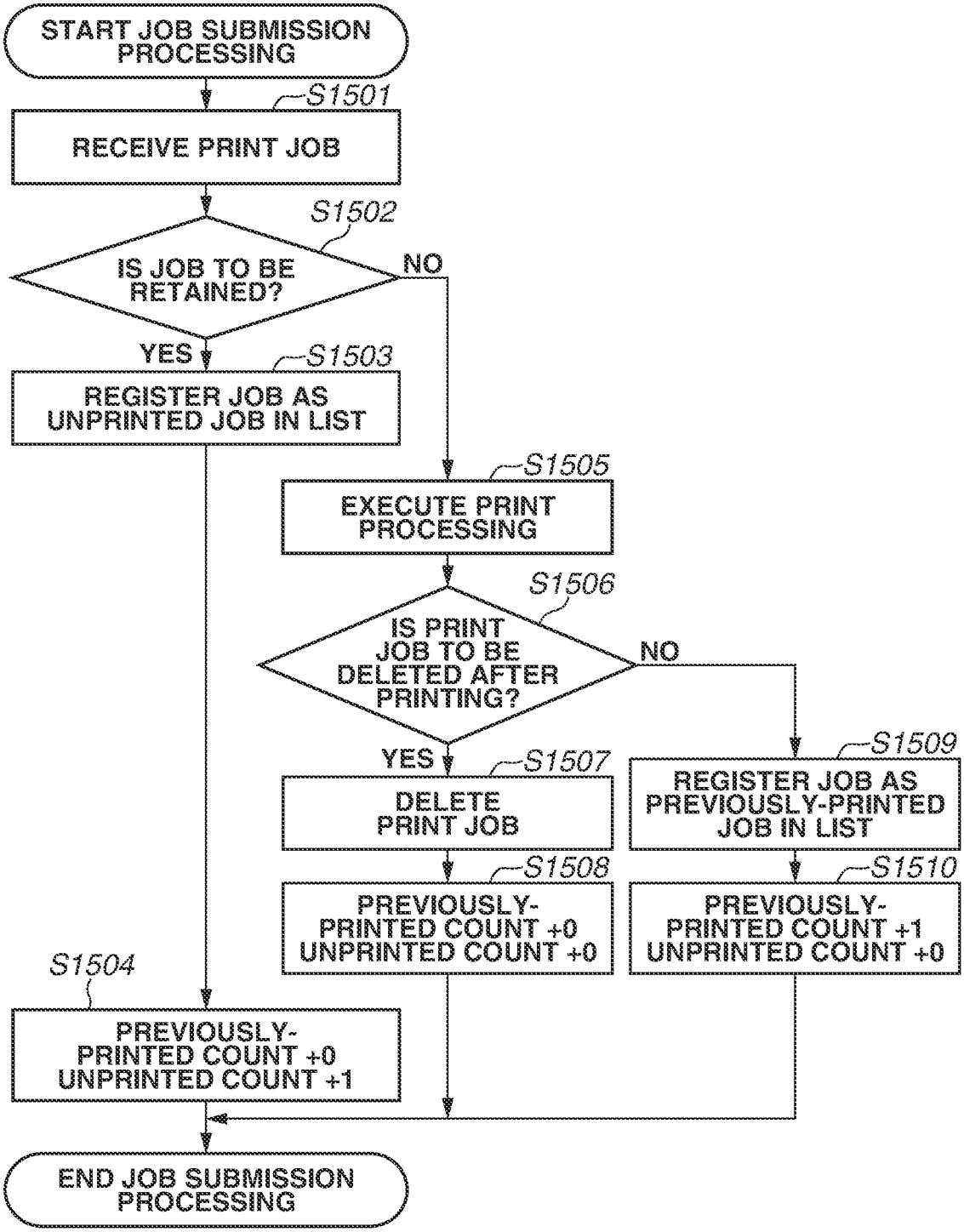
START JOB SUBMISSION PROCESSING
S1501
RECEIVE PRINT JOB
S1502
IS JOB TO BE RETAINED?
NO
YES
S1503
REGISTER JOB AS UNPRINTED JOB IN LIST
S1505
EXECUTE PRINT PROCESSING
S1506
IS PRINT JOB TO BE DELETED AFTER PRINTING?
NO
YES
S1507
DELETE PRINT JOB
S1508
PREVIOUSLY-PRINTED COUNT +0 UNPRINTED COUNT +0
S1509
REGISTER JOB AS PREVIOUSLY-PRINTED JOB IN LIST
S1510
PREVIOUSLY-PRINTED COUNT +1 UNPRINTED COUNT +0
S1504
PREVIOUSLY-PRINTED COUNT +0 UNPRINTED COUNT +1
END JOB SUBMISSION PROCESSING

FIG.16

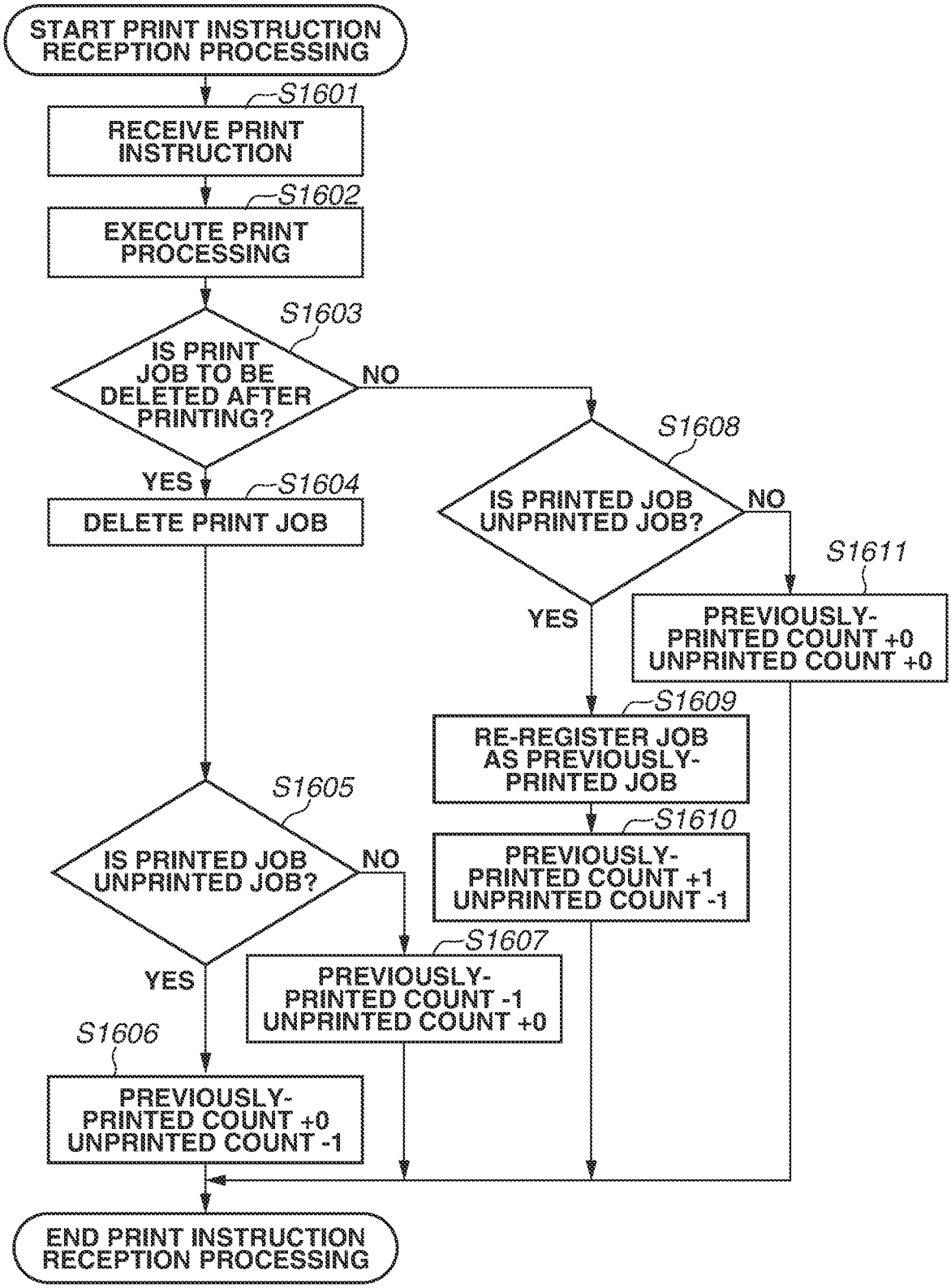
START PRINT INSTRUCTION RECEPTION PROCESSING
S1601
RECEIVE PRINT INSTRUCTION
S1602
EXECUTE PRINT PROCESSING
S1603
IS PRINT JOB TO BE DELETED AFTER PRINTING?
NO
YES
S1604
DELETE PRINT JOB
S1608
IS PRINTED JOB UNPRINTED JOB?
NO
YES
S1611
PREVIOUSLY-PRINTED COUNT +0 UNPRINTED COUNT +0
S1609
RE-REGISTER JOB AS PREVIOUSLY-PRINTED JOB
S1610
PREVIOUSLY-PRINTED COUNT +1 UNPRINTED COUNT -1
S1605
IS PRINTED JOB UNPRINTED JOB?
NO
YES
S1607
PREVIOUSLY-PRINTED COUNT -1 UNPRINTED COUNT +0
S1606
PREVIOUSLY-PRINTED COUNT +0 UNPRINTED COUNT -1
END PRINT INSTRUCTION RECEPTION PROCESSING

FIG.17

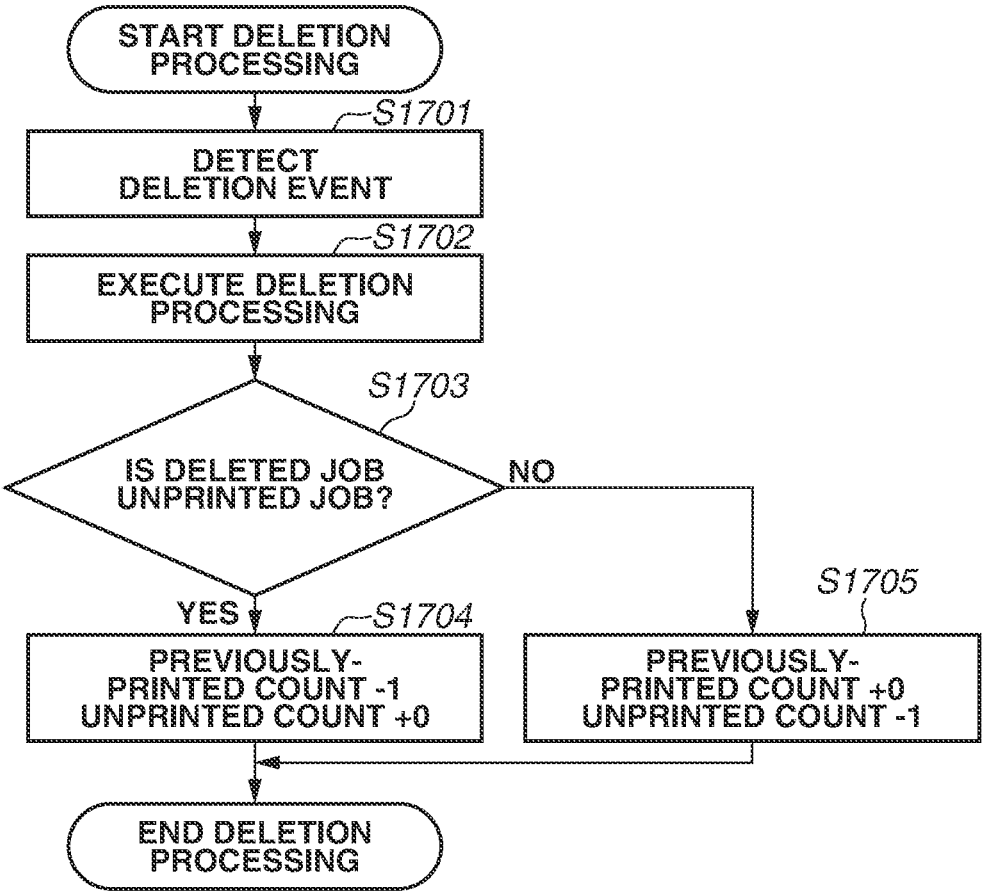
START DELETION PROCESSING
S1701
DETECT DELETION EVENT
S1702
EXECUTE DELETION PROCESSING
S1703
IS DELETED JOB UNPRINTED JOB?
NO
YES
S1704
PREVIOUSLY-PRINTED COUNT -1 UNPRINTED COUNT +0
S1705
PREVIOUSLY-PRINTED COUNT +0 UNPRINTED COUNT -1
END DELETION PROCESSING

FIG.18

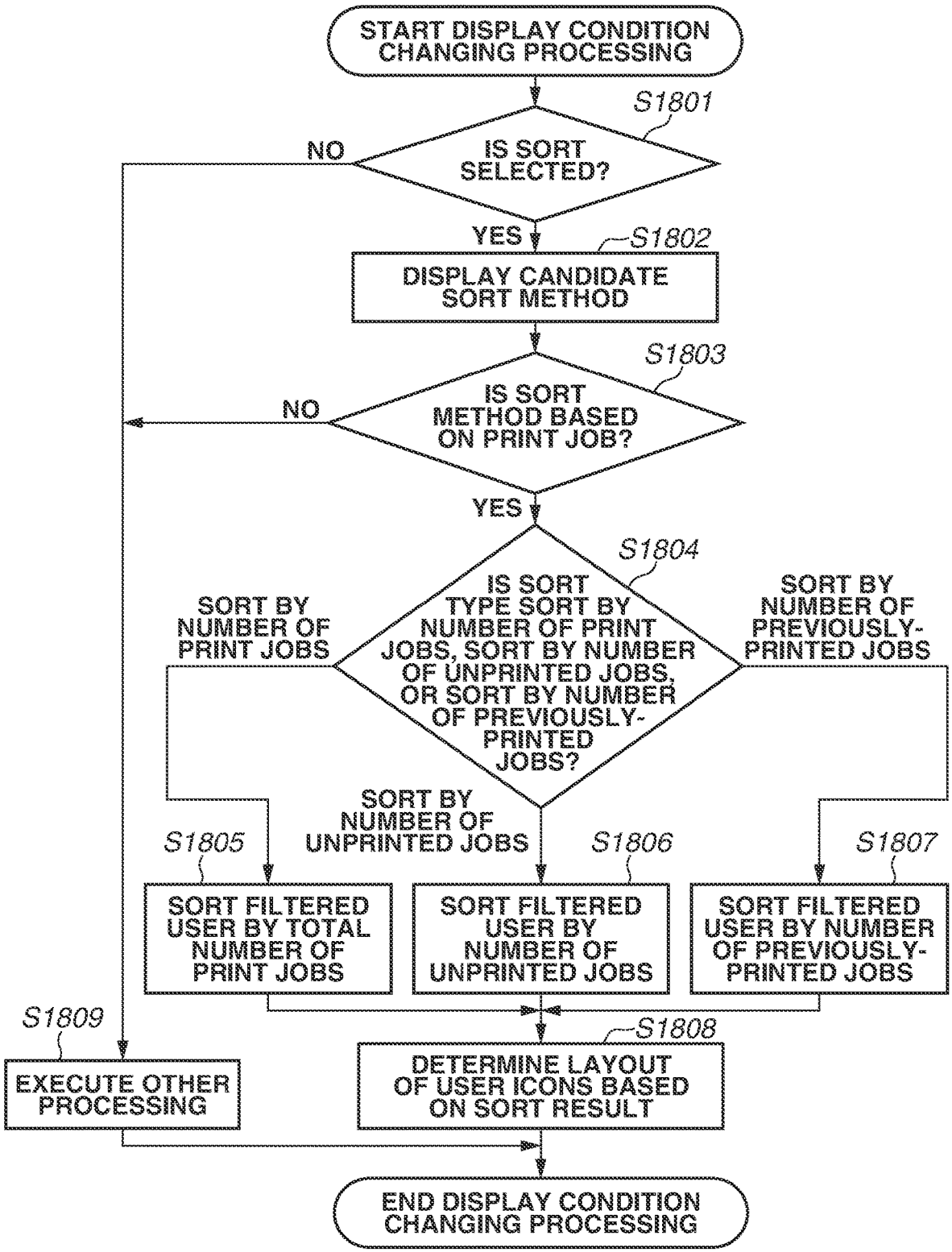
START DISPLAY CONDITION CHANGING PROCESSING
S1801
IS SORT SELECTED?
NO
YES
S1802
DISPLAY CANDIDATE SORT METHOD
S1803
IS SORT METHOD BASED ON PRINT JOB?
NO
YES
S1804
IS SORT TYPE SORT BY NUMBER OF PRINT JOBS, SORT BY NUMBER OF UNPRINTED JOBS, OR SORT BY NUMBER OF PREVIOUSLY-PRINTED JOBS?
SORT BY NUMBER OF PRINT JOBS
SORT BY NUMBER OF UNPRINTED JOBS
SORT BY NUMBER OF PREVIOUSLY-PRINTED JOBS
S1805
S1806
S1807
SORT FILTERED USER BY TOTAL NUMBER OF PRINT JOBS
SORT FILTERED USER BY NUMBER OF UNPRINTED JOBS
SORT FILTERED USER BY NUMBER OF PREVIOUSLY-PRINTED JOBS
S1808
DETERMINE LAYOUT OF USER ICONS BASED ON SORT RESULT
S1809
EXECUTE OTHER PROCESSING
END DISPLAY CONDITION CHANGING PROCESSING

IMAGE FORMING APPARATUS AND CONTROL METHOD FOR THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a Continuation of U.S. patent application Ser. No. 15/948,633, filed on Apr. 9, 2018, which claims the benefit of Japanese Patent Application No. 2017-081634, filed Apr. 17, 2017, each of which is hereby incorporated by reference herein in its entirety.

BACKGROUND

Field of the Disclosure

[0002] The present disclosure relates to an image forming apparatus and a method of controlling the same. The image forming apparatus is used as a facsimile machine, printer, copying machine, multi-function peripheral, etc.

Description of the Related Art

[0003] Image forming apparatuses such as printers are conventionally known as apparatuses for forming (printing) images on sheets. Further, image forming apparatuses having a user authentication function (login function) are popularly used in recent years.

[0004] Japanese Patent Application Laid-Open No. 2012-254618 discusses an image forming apparatus to which a user can log in by selecting a user icon displayed on a screen. The user logs in to the image forming apparatus to display a list of print jobs associated with the logged-in user among print jobs stored in the image forming apparatus. Then, the user can select a print job to be printed from the displayed print jobs and give an instruction to print the selected print job.

[0005] Further, the image forming apparatus discussed in Japanese Patent Application Laid-Open No. 2012-254618 hides a user icon of a user if no print job associated with the user is stored. In this way, the user icons of the users having an associated print job stored in the image forming apparatus become easy to recognize.

[0006] Meanwhile, the image forming apparatus discussed in Japanese Patent Application Laid-Open No. 2012-254618 is configured to automatically delete a print job after the printing of the print job is completed. There can be, however, a user who desires to reprint after the printing is completed, so it is desirable to include a function of not deleting but retaining previously-printed print jobs. In the case of not deleting but retaining previously-printed print jobs, however, unprinted jobs and previously-printed jobs are mixedly associated with the user. Thus, if the apparatus narrows down the user icons based solely on the presence/absence of a user job, the icons of the users having previously-printed print jobs and the icons of the users having unprinted print jobs can mixedly be displayed. Thus, the user attempting to log in to the apparatus needs to search for the user icon of the user from many candidates, and this is inconvenient for the user.

[0007] For example, the user attempting to log in to the apparatus to print an unprinted print job tries to find the user icon of the user with ease by first filtering the user icons using a condition "users having print jobs". However, the users having print jobs include users having previously-printed print jobs, so many candidate user icons are displayed. Thus, it can take time for the user to find the user icon of the user.

SUMMARY

[0008] The present disclosure is directed to an image forming apparatus with excellent usability for users using print data.

[0009] According to an aspect of the present disclosure, an image forming apparatus using an image forming unit configured to form an image on a sheet and a display unit configured to display information includes at least one controller having a processor that executes programs stored in a memory, the at least one controller configured to function as a management unit configured to manage print data in association with user information, the management unit configured to discriminably manage information about previously-printed print data and information about unprinted print data, and a unit configured to display on the display unit a user selection screen on which a plurality of selection objects corresponding to the user information is arrangeable and on which the selection object corresponding to the user information associated with the unprinted print data is arranged while no selection object corresponding to the user information associated with the previously-printed print data but not associated with the unprinted print data is arranged.

[0010] Further features of the present disclosure will become apparent from the following description of exemplary embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1**A is a diagram illustrating a configuration of an image forming system and FIG. **1**B is a diagram illustrating a process performed by the image forming system.

[0012] FIG. **2**A is a block diagram illustrating a hardware configuration of an information processing apparatus and FIG. **2**B is a diagram illustrating a software configuration of the information processing apparatus.

[0013] FIG. **3**A is a block diagram illustrating a hardware configuration of an image forming apparatus and FIG. **3**B is a diagram illustrating a software configuration of the image forming apparatus.

[0014] FIG. **4** is a diagram illustrating a configuration of a user database.

[0015] FIG. **5**A is a diagram illustrating a configuration of page description language (PDL) data and FIG. **5**B is a diagram illustrating a data configuration of a printer storage area.

[0016] FIG. **6** is a diagram illustrating a bibliographic information database.

[0017] FIG. **7**A is a diagram illustrating a menu screen, FIG. **7**B is a diagram illustrating a user selection screen, and FIG. **7**C is a diagram illustrating a print job selection screen.

[0018] FIG. **8**A is a diagram illustrating a print filter result, FIG. **8**B is a diagram illustrating an unprinted filter result, and FIG. **8**C is a diagram illustrating a previously-printed filter result.

[0019] FIG. **9** is a flowchart illustrating a process of print instruction processing according to one or more aspects of the present disclosure.

[0020] FIG. **10** is a flowchart illustrating a process of display condition changing processing according to one or more aspects of the present disclosure.

[0021] FIG. **11**A is a diagram illustrating the configuration of an aggregated database and FIG. **11**B is a diagram illustrating a sort by the number of print jobs.

[0022] FIG. **12**A is a diagram illustrating a sort by the number of unprinted jobs and FIG. **12**B is a diagram illustrating a sort by the number of previously-printed jobs.

[0023] FIG. **13**A is a diagram illustrating a sort tab and FIG. **13**B is a diagram illustrating a result of a sort by the number of print jobs.

[0024] FIG. **14**A is a diagram illustrating a result of a sort by the number of unprinted jobs and FIG. **14**B is a diagram illustrating a result of a sort by the number of previously-printed jobs.

[0025] FIG. **15** is a flowchart illustrating a process of job submission processing according to one or more aspects of the present disclosure.

[0026] FIG. **16** is a flowchart illustrating a process of print instruction reception processing according to one or more aspects of the present disclosure.

[0027] FIG. **17** is a flowchart illustrating a process of deletion processing according to one or more aspects of the present disclosure.

[0028] FIG. **18** is a flowchart illustrating a process of display condition changing processing according to one or more aspects of the present disclosure.

DESCRIPTION OF THE EMBODIMENTS

[0029] Various exemplary embodiments of the present disclosure will be described below. Configurations for implementing the present disclosure are not limited to those described in the exemplary embodiments. The configurations described in the exemplary embodiments can be replaced partially or entirely by an equivalent within a range that an advantage of the present disclosure is produced.

[0030] In a first exemplary embodiment, a print system (image forming system) will be described as an example in which a personal computer (PC) (information processing apparatus) transmits print data and a printer (image forming apparatus) receives and prints the print data.

[Print System]

[0031] FIG. **1**A is a diagram illustrating a configuration of the image forming system. A print system **100** includes a PC **101** and a printer **102**. The PC **101** and the printer **102** are communicably connected to each other via a local area network (LAN) **103**.

[0032] In the print system **100**, print data (print job) output by the PC **101** is downloaded and printed by the printer **102**.

[0033] The PC **101** is a commonly-used computer which functions as an external device with respect to a printing apparatus.

[0034] The PC **101** is capable of outputting print data based on a document file or image file.

[0035] The printer **102** is the image forming apparatus which performs printing on sheets (recording materials, paper) based on print data. The printer **102** is capable of receiving print data. The printer **102** is capable of performing printing based on print data. The printer **102** can be a multifunction peripheral (multifunction printer) (MFP) or single function printer (SFP). Further, the printer **102** can be an electrophotographic printer or inkjet printer.

[Image Forming Sequence]

[0036] Next, an entire sequence of printing using the print system **100** will be described below. FIG. **1**B is a diagram illustrating a process executed by the image forming system.

[0037] To start the image forming sequence, first, the user performs login processing to log in to the PC **101**. In the login processing, the user inputs user information such as a user account name and authentication information such as a password. The PC **101** performs user login processing based on the user-input information. The logged-in user designates a document to be printed and gives an instruction to execute a printer driver. When the printer driver is activated, then in step S**110**, the user designates a transmission destination of print data and print settings and then gives a print instruction. In the present exemplary embodiment, the printer **102** is designated as the transmission destination of the print data. In step S**111**, the PC **101** generates print data based on the designated document, print settings, user information about the logged-in user, etc. The generated print data has a configuration as illustrated in FIG. **5**A. FIG. **5**A is a diagram illustrating a configuration of page description language (PDL) data. When the print data is generated, then in step S**112**, the PC **101** transmits the print data to the printer **102**. When the print data is transmitted, the printer **102** performs processing to receive the print data. Then, in step S**113**, the printer **102** registers bibliographic information about the received print data in a bibliographic information database (DB). The bibliographic information DB contains information as illustrated in FIG. **5**B. FIG. **5**B is a diagram illustrating the configuration of the bibliographic information DB. In step S**114**, as the bibliographic information is registered, the printer **102** stores the print data in association with an account allowed to log in to the printer **102** and waits for a user instruction. The account is managed in a user DB illustrated in FIG. **4**. FIG. **4** illustrates the configuration of the user DB.

[0038] Then, in step S**115**, the user starts operating the printer **102**. In step S**116**, if the printer **102** detects a user operation, the printer **102** activates a display to display a login screen (user selection screen). In step S**117**, the user gives an instruction to change a display method if the user desires to change the display method of the user selection screen. In step S**118**, the printer **102** re-displays the user selection screen by the user-instructed method. Then, in step S**119**, the user selects a user icon (selection object) corresponding to the account of the user. In step S**120**, the printer **102** performs login processing using the account corresponding to the selected user icon. In the login processing, the user may be prompted to input a password. If the login is successful, the printer **102** displays a menu screen on which various functions are selectable. Then, in step S**121**, the user selects a print function. In step S**122**, if the print function is selected, the printer **102** displays a user job list screen. On the user job list screen is arranged identification information about print data associated with the logged-in user based on the bibliographic information. In step S**123**, when the user selects a job to be printed from the job list and gives a print instruction, then in step S**124**, the printer **102** performs print processing based on the selected print job.

[PC Hardware Configuration]

[0039] The hardware configuration of the PC **101** will be described below. FIG. **2**A is a block diagram illustrating the hardware configuration of the information processing apparatus. As illustrated in FIG. **2**A, the PC **101** includes a controller **200**, a display unit **204**, and an input unit **205**.

[0040] The display unit **204** is a device such as a display which displays information to the user. The input unit **205** is a user interface such as a keyboard and a mouse for inputting the contents of user instructions.

[0041] The controller **200** is a control device which performs various types of control. The controller **200** includes a central processing unit (CPU) **201**, a random-access memory (RAM) **202**, a read-only memory (ROM) **210**, a hard disk drive (HDD) **203**, a network interface card (NIC) **206**, and an interface (I/F) **211**. The components of the controller **200** are communicably connected to each other via a main bus **209**. The controller **200** can include one board or a plurality of boards.

[0042] The CPU **201** is a central processing unit (processor) which performs computation for various types of control. The RAM **202** is a system work memory used as a work area of the CPU **201**. Further, the RAM **202** functions as an image memory for temporarily storing print data and image data. The ROM **210** is a memory which stores various programs including a system boot program. The HDD **203** is a storage unit for storing system software and various types of data such as print data and image data. The HDD **203** is capable of storing PDL data. The NIC **206** is a network interface card for input and output of information to and from external devices via the LAN **103**. The I/F **211** is an interface for input and output of information to and from the display unit **204** and the input unit **205**. Alternatively, separate interfaces can be provided respectively to the display unit **204** and the input unit **205**.

[PC Software Configuration]

[0043] The software configuration of the PC **101** will be described below. FIG. **2**B is a block diagram illustrating the software configuration of the information processing apparatus. As illustrated in FIG. **2**B, the PC **101** includes a printer driver **251** as executable software **250**.

[0044] The printer driver **251** generates print data **500** in PDL data format based on document data (document). The PDL data is data which is described in PDL and interpretable by the printer **102**.

[0045] As illustrated in FIG. **5**A, the print data **500** contains a header portion **501** and a body portion **502**. The header portion **501** stores user information such as the user name, document information such as the document name, and setting information such as print settings (one-side/two-side, color/monochrome). The body portion **502** stores PDL commands. While the user name of the user having logged in to the PC **101** is used as user identification information in the present exemplary embodiment, any other information can be used as user identification (ID).

[Printer Hardware Configuration]

[0046] Next, the configuration of the printer **102** will be described below. FIG. **3**A is a block diagram illustrating the hardware configuration of the image forming apparatus. As illustrated in FIG. **3**A, the printer **102** includes a controller **300** (control unit), an operation panel **305**, and a print mechanism **307**.

[0047] The print mechanism **307** is a print mechanism (print engine) which is a mechanical mechanism for forming images on sheets. The print mechanism **307** functions as an image forming unit.

[0048] The operation panel **305** (operation unit) is a reception unit and a user interface for notifying the user of information and receiving user instructions. The operation panel **305** includes an input unit **305***a* (operation unit) for user input, such as an input key and a touch screen, and a notification unit **305***b* (display unit, informing unit) for notifying the user of information with light and sound, such as a liquid crystal panel and a speaker. The operation panel **305** outputs user-input information to the controller **300** and receives notification information to the user from the controller **300**.

[0049] The controller **300** is a control unit which comprehensively controls the entire printer **102** based on a program. The controller **300** includes a CPU **301**, a HDD **303**, a RAM **302**, a ROM **310**, and an I/F **311**. The components of the controller **300** are communicably connected to each other via a main bus **309**. The controller **300** can include one board or a plurality of boards.

[0050] The CPU **301** is a central processing unit (processor) which performs computation for various types of control. The HDD **303** is a storage unit for storing system software and various types of data such as print data and image data. The HDD **303** is capable of storing PDL data. The RAM **302** is a system work memory used as a work area of the CPU **301**. Further, the RAM **302** functions as an image memory for temporarily storing print data and image data. The ROM **310** is a memory which stores various programs including a system boot program. An NIC **306** is a communication interface for input and output of information to and from external devices via the LAN **103**. The I/F **311** is an interface for input and output of information to and from the print mechanism **307** and the operation panel **305**. Alternatively, separate interfaces can be provided respectively to the print mechanism **307** and the operation panel **305**.

[Printer Software Configuration]

[0051] The software configuration of the printer **102** will be described below. FIG. **3**B is a diagram illustrating the software configuration of the image forming apparatus.

[0052] The controller **300** functions as various functional units **320** by executing various programs. Specifically, a program stored in the ROM **310** or the HDD **303** is loaded into the RAM **302** and executed by the CPU **301** to realize each function. As illustrated in FIG. **3**B, the controller **300** includes the functions as a job management unit **321**, a user management unit **322**, and a list management unit **323**. The program processing for realizing each functional unit can partially or entirely be executed by an external device connected to the printer **102**, which is known as a cloud configuration.

[0053] The job management unit **321** is a functional unit which manages print jobs. The job management unit **321** registers, edits, and deletes information about each piece of print data on a bibliographic information database **600**. FIG. **6** is a diagram illustrating the bibliographic information database **600**. As illustrated in FIG. **6**, the bibliographic

information database **600** includes a job number column **601**, a job name column **602**, a user name column **603**, a print status column **604**, and other information columns. The job number column **601** specifies serial numbers for managing job information. The job name column **602** specifies the document names of print data. The user name column **603** specifies the owner names (transmitter names) of the print data. The print status column **604** specifies flag information "previously-printed" or "unprinted". The flag information "previously-printed" indicates that printing using the print data is previously performed, whereas the flag information "unprinted" indicates that printing using the print data is not previously performed. Further, the bibliographic information database **600** manages information such as the print settings and submission time/date.

[0054] The user management unit **322** is a functional unit which manages information about users of the printer **102**. The user management unit **322** registers, edits, and deletes information about the users on a user database **400**. As illustrated in FIG. **4**, the user database **400** includes a user number **401**, a user name **402**, and a password **403**. The user number **401** is a serial number for managing the user information. The user name **402** is a user account name which is used to log in. In the present exemplary embodiment, the owner name of print data is used as the user account. A user account name which is different from the owner name of the print data can be used if the owner name of the print data can be associated with the user account. The password **403** is a password which is required to be input to log in to the user account. The password can be set at the time of generating the user account or editing the user information. The password can be unset if there are no security risks.

[0055] In the present exemplary embodiment, the user database **400** is registered in advance by an administrator user. The user database **400** can be downloaded from a management server (not illustrated) to be registered.

[0056] The list management unit **323** is a functional unit for controlling the display contents of the user icons. Details thereof will be described below.

[0057] Next, the configuration of data stored in the storage area of the printer **102** such as the HDD **303** and the ROM **310** will be described below. FIG. **5**B illustrates the data configuration in the storage area of the image forming apparatus. An information storage area **510** is a functional unit which manages information used in the printer **102**. As illustrated in FIG. **5**B, the information storage area **510** includes a job information storage area **511**, a user information storage area **512**, and a setting information storage area **513**. The job information storage area **511** is a data area for managing the print data **500**, the bibliographic information database **600**, etc. and is mainly used by the job management unit **321**. The user information storage area **512** is an area for managing the user database **400**, etc. and is mainly used by the user management unit **322**. The setting information storage area **513** is a data area for managing setting values for use in various types of control and is used by various control programs. In the present exemplary embodiment, setting values such as top screen login settings and deletion-after-printing settings are stored.

[Display Screen]

[0058] Next, a screen displayed on the display unit **305***b* of the operation panel **305** will be described below. FIG. **7**A is a diagram illustrating a menu screen. FIG. **7**B is a diagram illustrating a user selection screen. FIG. **7**C is a diagram illustrating a print job selection screen.

[0059] As illustrated in FIG. **7**A, the display unit **305***b* is capable of displaying a menu screen **700**. The menu screen **700** includes a copy button **701**, a personal print button **702**, and a scan-and-send button **703**.

[0060] The copy button **701** is a button object for using a copy function of the printer **102**. If the copy button **701** is selected, the controller **300** displays a copy instruction screen (not illustrated) on the display unit **305***b*.

[0061] The scan-and-send button **703** is a button object for using the copy function of the printer **102**. If the scan-and-send button **703** is selected, the controller **300** displays a scan-and-send instruction screen (not illustrated) on the display unit **305***b*.

[0062] The personal print button **702** is a button object for using a personal print function of the printer **102**. If the personal print button **702** is selected, the controller **300** displays a personal print instruction screen (print job selection screen) **720** on the display unit **305***b*.

[0063] The personal print instruction screen **720** is a screen for inputting an instruction to print the print data stored in the HDD **303**. The instruction screen **720** includes a job list **721**, a logout button **722**, a print setting button **723**, a print start button **724**, an all button **725**, an unprinted button **726**, and a previously-printed button **727**. The job list **721** is a list of information about print-instructable jobs among the print jobs for which print data is stored in the HDD **303**.

[0064] The job list **721** includes identification information about each print job, such as the document name, submission time information, number-of-pages information, and print status information. The user can select one or more print jobs to operate from the job list **721**. The jobs displayed on the job list **721** are the jobs registered in the bibliographic information database **600**. In the present exemplary embodiment, especially, the print jobs associated with the logged-in user of the printer **102** are displayed.

[0065] The logout button **722** is a button for logging out of the printer **102**. If the logout button **722** is selected, the logged-in user (e.g., user A) logs out, and the printer **102** is changed to the state in which nobody is logged in to the printer **102**.

[0066] The print setting button **723** is a button for setting print settings with respect to the print job selected from the job list **721**. If the print setting button **723** is selected, the controller **300** displays a print setting screen (not illustrated) on the display unit **305***b*.

[0067] The print start button **724** is a button for giving an instruction to execute printing of the selected job. If the print start button **724** is selected, the controller **300** causes the print mechanism **307** to execute image forming based on the selected job.

[0068] The all button **725** is a button for displaying both the jobs of the print status "previously-printed" and the jobs of the print status "unprinted" among the print jobs associated with the logged-in user. The instruction screen **720** indicates the state in which the all button **725** is selected.

[0069] The unprinted button **726** is a button for displaying the jobs of the print status "unprinted" among the print jobs associated with the logged-in user.

[0070] The previously-printed button **727** is a button for displaying the jobs of the print status "previously-printed" among the print jobs associated with the logged-in user

[0071] Meanwhile, the user needs to log in to the printer **102** in advance in order to display the jobs associated with the logged-in user on the instruction screen **720**. The user login is performed using a user selection screen **710**.

[0072] The user selection screen **710** is a screen for selecting an account to log in to the printer **102**. The user selection screen **710** includes a filter tab **711**, a sort tab **712**, a display area **713**, and a next-page button **714**.

[0073] In the display area **713** is arranged and displayed a plurality of user icons corresponding to the accounts allowed to log in to the printer **102** (a plurality of arrangements is possible). If one user icon is selected in the display area **713**, the user can log in to the printer **102** using the selected account. Alternatively, after a user account is selected, authentication information such as a password may be requested to allow the user account to log in only if the authentication information matches.

[0074] The filter tab **711** is a tab for changing the user icons to be displayed on the display area **713**. From the filter tab **711** an all filter, a print filter, a print (unprinted) filter, or a print (previously-printed) filter is selectable. If the all filter is selected, the icons of all the users managed by the user database are to be displayed. If the print filter is selected, the icons of the users having associated print data stored in the HDD **303**, i.e., the icons of the users having an associated job registered in the bibliographic information database **600**, are to be displayed. If the print (unprinted) filter is selected, the icons of the users having a job of the print status "unprinted" registered as an associated job are to be displayed among the jobs registered in the bibliographic information database **600**. If the print (previously-printed) filter is selected, the icons of the users having a job of the print status "previously-printed" registered as an associated job are to be displayed among the jobs registered in the bibliographic information database **600**.

[0075] The sort tab **712** is a tab for changing the display order (arrangement layout) of the user icons displayed in the display area **713**. Detailed description thereof is omitted in the present exemplary embodiment.

[0076] The next-page button **714** is a button for changing the displayed user icons among the user icons to be displayed. If the next-page button **714** is selected, for example, the user icons displayed on the display area **713** are changed from "administrator", "edward", "goto", and "hayashi" to "ito", "ivy", and "kaneko".

[Icon Filter]

[0077] Details of the icon filters which become usable when the filter tab **711** is selected will be described below.

[0078] FIG. **8**A is a diagram illustrating a print filter result. In the print filter, the icons of the users having an associated job registered in the bibliographic information database **600** are displayed. The users having a job registered in the bibliographic information database **600** are "edward", "hayashi", "goto", and "ito". Thus, the display area **713** displays the user icons "edward", "hayashi", "goto", and "ito" on a print filter screen **800**.

[0079] FIG. **8**B is a diagram illustrating an unprinted filter result. In the unprinted filter, the icons of the users having a job of the status "unprinted" registered in the bibliographic information database **600** are displayed. The users having an "unprinted" job registered in the bibliographic information database **600** are "edward", "hayashi", and "ito". Thus, the display area **713** displays the user icons "edward", "hayashi", and "ito" on an unprinted filter screen **810**.

[0080] FIG. **8**C is a diagram illustrating a previously-printed filter result. In the previously-printed filter, the icons of the users having a job of the status "previously-printed" registered in the bibliographic information database **600** are displayed. The users having a "previously-printed" job registered in the bibliographic information database **600** are "edward" and "goto". Thus, the display area **713** displays the user icons "edward" and "goto" on a previously-printed filter screen **820**.

[Process of Print Instruction Processing]

[0081] A process from detection of a user operation by the printer **102** to execution of print processing will be described. FIG. **9** is a flowchart illustrating print instruction processing.

[0082] In step S**901**, if the operation panel **305** is operated by the user, the controller **300** detects the user operation. Then, in step S**902**, the controller **300** reads the login setting and determines whether the login setting is the top screen login setting. If the login setting is the top screen login setting (YES in step S**902**), the processing proceeds to step S**904**. If the login setting is not the top screen login setting (NO in step S**902**), the controller **300** displays the menu screen **700** on the display unit **305***b*. Then, in step S**903**, the controller **300** receives the selection of the personal print button **702** (print function) by the user operation.

[0083] In step S**904**, the controller **300** displays the user selection screen **710** (user list) on the display unit **305***b*. Next, the controller **300** determines whether an instruction to change the user icon display condition is given. If an instruction to change the user icon display condition is given, i.e., if the filter tab **711** or the sort tab **712** is selected, the controller **300** determines that an instruction to change the user icon display condition is given (YES in step S**905**). Then, in step S**906**, the controller **300** executes display condition changing processing. In step S**904**, after the display condition is changed, the controller **300** updates the user selection screen **710**.

[0084] On the other hand, if no instruction to change the display condition is given (NO in step S**905**) but an instruction to select a user icon is received in step S**907**, then in step S**908**, the controller **300** determines whether the setting is the top screen login setting. If the setting is the top screen login setting (YES in step S**908**), the controller **300** displays the menu screen **700** on the display unit **305***b*. Then, in step S**909**, the selection of the personal print button **702** (print function) by the user operation is received. On the other hand, if the setting is not the top screen login setting (NO in step S**908**), the processing proceeds to step S**910**. Accordingly, the print function is selected in either step S**903** or S**909**.

[0085] In step S**910**, the controller **300** displays the instruction screen **720** (job list screen) on the display unit **305***b*. Then, in step S**911**, the controller **300** receives a print instruction by receiving the selection of a job from the job list **721** and the selection of the print start button **724**. If the print instruction is received, the controller **300** causes the print mechanism **307** to execute image forming based on the selected print job. In this way, the process is ended.

[Process of Display Condition Changing Processing]

[0086] Next, details of a process of display condition changing processing in step **S906** will be described below. FIG. **10** is a flowchart illustrating the process of display condition changing processing. The display condition changing processing is executed by the controller **300** which functions as the list management unit **323**.

[0087] In step **S1001** in the process of display condition changing processing, the controller **300** determines a change instruction method.

[0088] If the change method is not a filter (NO in step **S1001**), for example, if the sort tab **712** is selected, other processing is executed. In the present exemplary embodiment, the changing processing by the filter will be described, and description of the other processing in step **S1010** is omitted.

[0089] If the change method is the filter (YES in step **S1001**), i.e., if the filter tab **711** is selected, then in step **S1002**, the controller **300** displays candidate filter methods on the display unit **305***b*. In step **S1003**, if a filter method is selected from the filter candidates, the controller **300** determines whether the selected filter method is a filter method based on print jobs. If the selected filter method is not a filter method based on print jobs (NO in step **S1003**), then in step **S1010**, the other processing is executed. If the selected filter method is a filter method based on print jobs (YES in step **S1003**), then in step **S1004**, the filter type is determined.

[0090] If the filter type is a print filter (PRINT FILTER in step **S1004**), then in step **S1005**, job information about all the jobs is extracted from the job list. If the filter type is the unprinted filter (to-be-printed filter) (UNPRINTED FILTER in step **S1004**), then in step **S1006**, job information about a job of the unprinted status is extracted from the job list. If the filter type is the previously-printed filter (PREVIOUSLY-PRINTED FILTER in step **S1004**), then in step **S1007**, job information about a job of the previously-printed status is extracted from the job list. Then, in step **S1008**, the controller **300** extracts the user name associated with the extracted job. Then, the controller **300** sets the icon of the extracted user name as an icon to be displayed. In this way, the process of display condition changing processing is performed.

[Advantage]

[0091] The present exemplary embodiment allows the user icons to be displayed by filtering users having print jobs. Thus, the user attempting to print a print job stored in the printer **102** can efficiently find the user icon of the user.

[0092] The present exemplary embodiment allows the user icons to be displayed by filtering the users by the condition "users having an unprinted print job". Thus, the user attempting to print an unprinted job stored in the printer **102** can efficiently find the user icon of the user.

[0093] The present exemplary embodiment allows the user icons to be displayed by filtering the users by the condition "users having a previously-printed print job". Thus, the user attempting to print a previously-printed job stored in the printer **102** can efficiently find the user icon of the user.

[0094] In the first exemplary embodiment, the example in which the user icons are filtered is described. In a second exemplary embodiment, an example in which the user icons are sorted will be described. The basic configuration of the print system according to the second exemplary embodiment is similar to the basic configuration of the print system according to the first exemplary embodiment except for a part of the configuration. Thus, components similar to those in the first exemplary embodiment are given the same reference numerals, and description thereof is omitted.

[Aggregated Database]

[0095] In the first exemplary embodiment, the jobs are extracted from the bibliographic information database **600** to filter the users. In the second exemplary embodiment, an aggregated database **1110** of the number of print jobs aggregated based on bibliographic information (not illustrated) different from the bibliographic information database **600** is used.

[0096] FIG. **11**A is a diagram illustrating the configuration of the aggregated database **1110**. The aggregated database **1110** includes a user name column **1111**, a number-of-unprinted-jobs column **1112**, a number-of-previously-printed-jobs column **1113**, and a total-number-of-jobs column **1114**. The user name column **1111** stores identification information about the users associated with the print jobs. The number-of-unprinted-jobs column **1112** stores the number of unprinted print jobs associated with the users. The number-of-previously-printed-jobs column **1113** stores the number of previously-printed print jobs associated with the users. The total-number-of-jobs column **1114** stores the number of print jobs associated with the users. In FIG. **11**A, the aggregated database **1110** is sorted by user name.

[0097] FIG. **11**B is a diagram illustrating a result of sorting the aggregated database **1110** by the number of print jobs. FIG. **12**A is a diagram illustrating a result of sorting the aggregated database **1110** by the number of unprinted jobs. FIG. **12**B is a diagram illustrating a result of sorting the aggregated database **1110** by the number of previously-printed jobs.

[0098] In a sort-by-number-of-print-jobs result **1120**, data is arranged in descending order of the number of print jobs associated with the user. In a sort-by-number-of-unprinted-jobs result **1210**, data is arranged in descending order of the number of unprinted jobs associated with the user. In a sort-by-number-of-previously-printed-jobs result **1220**, data is arranged in descending order of the number of previously-printed jobs associated with the user.

[Display Screen]

[0099] Next, a screen displayed on the display unit **305***b* in the second exemplary embodiment will be described. FIG. **13**A is a diagram illustrating a sort tab. FIG. **14**A is a diagram illustrating a sort by the number of unprinted jobs. FIG. **14**B is a diagram illustrating a sort by the number of previously-printed jobs.

[0100] If the sort tab **712** is selected on the user selection screen **710**, the controller **300** changes the user selection screen **710** to a sort tab selected state **1310**. Examples of a candidate sort method include a sort by name, a sort by the number of print jobs, a sort by the number of unprinted jobs, and a sort by the number of previously-printed jobs. In the present exemplary embodiment, the user icon arrangement priority in the display area **713** is the upper left, the upper right, the lower left, and the lower right in this order. Thus, in the case of the sort by name, the controller **300** arranges "administrator", "edward", "goto", and "hayashi" in the

upper left, the upper right, the lower left, and the lower right in this order based on the aggregated database **1110** (sort-by-name result). On the second page is arranged "ito". Alternatively, any other method of arrangement priority can be used. Further, the layout of the user icons is not limited to 2×2 and can be designed as appropriate, such as 1×4 or 3×3.

[0101] If the sort by the number of print jobs is selected from the sort tab **712**, the controller **300** displays on the display unit **305***b* a number-of-print-jobs sort screen **1320** based on the sort-by-number-of-print-jobs result **1120**. At this time, "goto", "ito", "hayashi", and "edward" are arranged on the first page and "administrator" on the second page in the display area **713**.

[0102] If the sort by the number of unprinted jobs is selected from the sort tab **712**, the controller **300** displays a number-of-unprinted-jobs sort screen **1410** on the display unit **305***b* based on the sort-by-number-of-unprinted-jobs result **1210**. At this time, "hayashi", "goto", "edward", and "ito" are arranged on the first page and "administrator" on the second page in the display area **713**. At this time, "ito" having no unprinted print job is arranged at a position remote from "hayashi" than "goto" and "edward". Further, "administrator" having no print job is arranged at a position remote from "hayashi" than "ito", "goto", and "edward".

[0103] If the sort by the number of previously-printed jobs is selected from the sort tab **712**, the controller **300** displays a number of previously-printed jobs sort screen **1420** on the display unit **305***b* based on the sort-by-number-of-previously-printed-jobs result **1220**. At this time, "ito", "goto", "edward", and "hayashi" are arranged on the first page and "administrator" on the second page in the display area **713**. At this time, "hayashi" having no previously-printed print job is arranged at a position remote from "ito" than "goto" and "edward". Further, "administrator" having no print job is arranged at a position remote from "ito" than "hayashi", "goto", and "edward".

[Process of Display Condition Changing Processing]

[0104] Next, details of the process of display condition changing processing in step S**906** will be described. FIG. **18** is a flowchart illustrating the process of display condition changing processing. The display condition changing processing is executed by the controller **300** which functions as the list management unit **323**.

[0105] In step S**1801** in the process of display condition changing processing, the controller **300** determines the change instruction method.

[0106] If the change method is not a sort (NO in step S**1801**), e.g., if the filter tab **711** is selected, then in step S**1809**, other processing is executed. In the present exemplary embodiment, the changing processing by the sort will be described, and description of the other processing in step S**1809** is omitted.

[0107] If the change method is a sort (YES in step S**1801**), i.e., if the sort tab **712** is selected, then in step S**1802**, the controller **300** displays candidate sort methods on the display unit **305***b*. If a sort method is selected from the candidate sort methods, then in step S**1803**, the controller **300** determines whether the selected sort method is a sort method based on print jobs. If the selected sort method is not a sort method based on print jobs (NO in step S**1803**), then in step S**1809**, the other processing is executed. If the selected sort method is a sort method based on print jobs (YES in step S**1803**), then in step S**1804**, the sort type is determined.

[0108] If the sort type is a sort by the number of print jobs (SORT BY NUMBER OF PRINT JOBS in step S**1804**), then in step S**1805**, the users in the filter are sorted by the number of print jobs and, for example, the sort-by-number-of-print-jobs result **1120** is acquired. If the sort type is the unprinted sort (to-be-printed sort) (SORT BY NUMBER OF UNPRINTED JOBS in step S**1804**), then in step S**1806**, the users in the filter are sorted by the number of unprinted jobs and, for example the sort-by-number-of-unprinted-jobs result **1210** is acquired. If the sort type is the previously-printed sort (SORT BY NUMBER OF PREVIOUSLY-PRINTED JOBS in step S**1804**), then in step S**1807**, the users in the filter are sorted by the number of previously-printed jobs and, for example, the sort-by-number-of-previously-printed-jobs result **1220** is acquired.

[0109] Then, in step S**1808**, the controller **300** determines the layout of the user icons based on the sort result.

[0110] In this way, the process of display condition changing processing is ended.

[Counting the Number of Print Jobs]

[0111] The counting of the number of print jobs to generate the aggregated database **1110** will be described. FIG. **15** is a flowchart illustrating a process of counting the number of print jobs which is involved in the job submission processing. FIG. **16** is a flowchart illustrating a process of counting the number of print jobs which is involved in the print instruction reception processing. FIG. **17** is a flowchart illustrating a process of counting the number of print jobs which is involved in the deletion processing.

[0112] First, the process of counting the number of print jobs which is involved in the job submission processing will be described below. In step S**1501** in the job submission processing, the controller **300** first receives a print job. Then, in step S**1502**, the controller **300** determines whether the received job is a job to be retained.

[0113] If the print job is to be retained (YES in step S**1502**), then in step S**1503**, the received job is registered as an unprinted job in the bibliographic information database **600**. Then, in step S**1504**, the unprinted count of the user associated with the received job is changed by "+1" in the aggregated database **1110**.

[0114] If the print job is not to be retained (NO in step S**1502**), then in step S**1505**, the controller **300** causes the print mechanism **307** to execute image forming based on the received job.

[0115] Then, the controller **300** determines whether to delete the print job. If deletion-after-printing is designated with respect to the print job, or if a deletion-after-printing mode is set to the printer **102** (YES in step S**1506**), then in step S**1507**, the print job is deleted. Then, in step S**1508**, the count of the number of jobs of the user in the aggregated database **1110** is not changed, and the process is ended.

[0116] If neither the deletion-after-printing is designated with respect to the print job nor the deletion-after-printing mode is set to the printer **102** (NO in step S**1506**), then in step S**1509**, the received job is registered as a previously-printed job in the bibliographic information database **600**. Then, in step S**1510**, the previously-printed count of the user associated with the received job in the aggregated database **1110** is changed by "+1".

[0117] In this way, the process of counting the number of print jobs which is involved in the job submission processing is ended.

[0118] Next, the process of counting the number of print jobs which is involved in the print instruction reception processing will be described. In step **S1601** in the print instruction reception processing, the controller **300** first receives a print instruction from the user via the operation panel **305**. Then, in step **S1602**, the controller **300** causes the print mechanism **307** to execute printing based on the print job for which the print instruction is given.

[0119] Then, in step **S1603**, the controller **300** determines whether to delete the print job. If the print instruction is with the designation of deletion-after-printing, or if the deletion-after-printing mode is set to the printer **102** (YES in step **S1603**), then in step **S1604**, the controller **300** deletes the print job. Further, in step **S1605**, the controller **300** determines whether the print job for which the print instruction is given is an unprinted job. If the printed job is an unprinted job (YES in step **S1605**), then in step **S1606**, the controller **300** changes the unprinted count of the user associated with the printed job to "−1". If the printed job is previously-printed job (NO in step **S1605**), then in step **S1607**, the controller **300** changes the printed count of the user associated with the printed job by "−1".

[0120] If the print job is not to be deleted after the printing (NO in step **S1603**), then in step **S1608**, the controller **300** determines whether the print job for which the print instruction is given is a previously-printed job or unprinted job.

[0121] If the printed job is an unprinted job (YES in step **S1608**), the controller **300** re-registers the print job as a previously-printed job. Specifically, "unprinted" in the print status column **604** in the bibliographic information database **600** is rewritten to "previously-printed". Then, in step **S1610**, the unprinted count of the user associated with the printed job is changed by "−1" and the previously-printed count by "+1".

[0122] If the printed job is a previously-printed job (NO in step **S1608**), then in step **S1611**, the controller **300** does not change the job count of the associated with the printed job, and the process is ended.

[0123] Next, the process of counting the number of print jobs which is involved in the deletion processing will be described. In step **S1701** in the deletion processing, the controller **300** detects a deletion event. The deletion event is different from the deletion-after-printing. For example, the deletion event is detected in a case where the user operating the operation panel **305** designates the print job deletion. Further, the deletion event is detected in a case where a predetermined time passes from the print job submission time. As to an automatic deletion after job submission, the job deletion timing can be set as appropriate, such as 1 hour, 6 hours, 12 hours, 24 hours, 1 week, or 1 month.

[0124] If such a deletion event is detected, then in step **S1702**, the controller **300** performs print job deletion processing. Further, in step **S1703**, the controller **300** determines whether the deleted print job is an unprinted job or a previously-printed job. If the deleted print job is an unprinted job (YES in step **S1703**), the previously-printed count of the user associated with the deleted print job is changed by "−1". If the deleted print job is a previously-printed job (YES in step **S1703**), the controller **300** changes the previously-printed count of the user associated with the deleted print job by "−1".

[0125] In this way, the process of counting the number of print job which is involved in the deletion processing is ended.

[Advantage]

[0126] The present exemplary embodiment allows the user icons to be displayed by sorting the users by the number of print jobs. Thus, the user attempting to print a print job stored in the printer **102** can efficiently find the user icon of the user.

[0127] The present exemplary embodiment allows the user icons to be displayed by sorting the users by the number of unprinted print jobs. Thus, the user attempting to print an unprinted print job stored in the printer **102** can efficiently find the user icon of the user.

[0128] The present exemplary embodiment allows the user icons to be displayed by sorting the users by the number of previously-printed print jobs. Thus, the user attempting to print a previously-printed print job stored in the printer **102** can efficiently find the user icon of the user.

[0129] While the first and second exemplary embodiments are described above as separate exemplary embodiments, the first and second exemplary embodiments can be combined. Specifically, the user filter and the user sort can be combined.

[0130] While the filter is applied to all the user icons when the filter is selected in the first exemplary embodiment, a predetermined specific user icon can be exempted from the application of the filter. For example, the icon of the user having administrative right, such as "administrator", can be displayed as an exception regardless of the presence/absence of an unprinted job/previously-print job. Similarly, a specific user icon can be excluded from the sort and arranged at a specific position.

[0131] In the first exemplary embodiment, a user icon having no unprinted job is hidden at the time of the filter by unprinted jobs. The filter method is not limited to this method. A user icon having no unprinted job can be masked (grayed out).

[0132] While the user is associated with the print job by adding a user ID to the print data in the first exemplary embodiment, the method of associating a user with a print job is not limited to the above-described method. For example, the user and a specific box (folder) can be associated in advance, and a print job based on data stored in the specific box can be treated as a print job associated with the user.

[0133] The present disclosure can also be realized by a process in which a program for realizing one or more functions of the above-described exemplary embodiments is supplied to a system or apparatus via a network or storage medium and then one or more processors of a computer of the system or apparatus is caused to read and execute the program. Further, the present disclosure can also be realized by a circuit (e.g., application-specific integrated circuit (ASIC)) which realizes one or more functions.

[0134] Further, the present disclosure is applicable to a system including a plurality of devices or an apparatus including a single device.

[0135] The present disclosure provides an image forming apparatus with great usability for the users using print data.

[0136] The present disclosure is not limited to the above-described exemplary embodiments and can be modified (including organic combinations of the exemplary embodi-

ments) in various ways based on the spirit of the present disclosure, and such modifications are not excluded from the scope of the present disclosure. Specifically, every combination of the above-described exemplary embodiments and modified examples thereof is encompassed within the scope of the present disclosure.

[0137] Embodiments of the present disclosure can also be realized by a computer of a system or apparatus that reads out and executes computer executable instructions recorded on a storage medium (e.g., non-transitory computer-readable storage medium) to perform the functions of one or more of the above-described embodiment(s) of the present disclosure, and by a method performed by the computer of the system or apparatus by, for example, reading out and executing the computer executable instructions from the storage medium to perform the functions of one or more of the above-described embodiment(s). The computer may comprise one or more of a central processing unit (CPU), micro processing unit (MPU), or other circuitry, and may include a network of separate computers or separate computer processors. The computer executable instructions may be provided to the computer, for example, from a network or the storage medium. The storage medium may include, for example, one or more of a hard disk, a random-access memory (RAM), a read only memory (ROM), a storage of distributed computing systems, an optical disk (such as a compact disc (CD), digital versatile disc (DVD), or Blu-ray Disc (BD)™), a flash memory device, a memory card, and the like.

[0138] While the present disclosure has been described with reference to exemplary embodiments, the scope of the following claims are to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

What is claimed is:

1. An image forming apparatus using an image forming unit configured to form an image on a sheet and a display unit configured to display information, the image forming apparatus comprising:

at least one controller having a processor that executes programs stored in a memory device, the at least one controller configured to function as:

a management unit configured to manage print data in association with user information, the management unit configured to discriminably manage information about previously-printed print data and information about unprinted print data; and

a unit configured to display on the display unit a user selection screen on which a plurality of selection objects corresponding to the user information is arrangeable and on which the selection object corresponding to the user information associated with the unprinted print data is arranged while no selection object corresponding to the user information associated with the previously-printed print data but not associated with the unprinted print data is arranged.

* * * * *