ATM system description

(transcribed from PC Jorgensen, Software Testing, Ch.2: CRC Press, 2002)

The ATM system communicates with bank customers via the 15 screens shown in Figure 1. Using a terminal with features as shown in Figure 2, ATM customers can select any of the three transaction types: deposits, withdrawals, and balance inquiries. These transactions can be done on two types of accounts: checking and savings.

When a bank customer arrives at an ATM station, screen 1 is displayed. The bank customer accesses the ATM system with a plastic card encoded with a personal account number (PAN), which is a key to an internal customer account file, containing, among other things, the customer's name and account information. If the customer's PAN matches the information in the customer account file, the system present screen 2 to the customer. If the customer's PAN is not found, screen 4 is displayed, and the card is kept.

At screen 2, the customer is prompted to enter his or her personal identification number (PIN). If the PIN is correct (i.e., matches the information in the customers account file), the system displays screen 5; otherwise screen 3 is displayed. The customer has three chances to get the PIN correct; after three failures, screen 4 is displayed, and the card is kept.

On entry to screen 5, the system adds two pieces of information to the customer's account file: the current date and an increment to the number of ATM sessions. The customer selects the desired transaction from the options shown on screen 5; then the system immediately displays screen 6, where the customer chooses the account to which the selected transaction will be applied.

If balance is requested, the system checks the local ATM file for any unposted transactions and reconciles these with the beginning balance for that day from the customer account file. Screen 14 is then displayed.

If deposit is requested, the status of the deposit envelope slot is determined from a field in the terminal control file. If no problem is known, the system displays screen 7 to get the transaction amount. If a problem occurs with the deposit envelope slot, the system displays screen 12. Once the deposit amount has been entered, the system displays screen 13, accepts the deposit envelope, and processes the deposit. The deposit amount is entered as an unposted amount in the local ATM file, and the count of deposits per month is incremented. Both of these (and other information) are processed by the master ATM (centralized) system once a day. The system then displays screen 14.

If withdrawal is requested, the system checks the status (jammed or free) of the withdrawal chute in the terminal control file. If jammed, screen 10 is displayed; otherwise, screen 7 is displayed so the customer can enter the withdrawal amount. Once the withdrawal amount is entered, the system checks the terminal status file to see if it has enough money to dispense. If it does not, screen 9 is displayed; otherwise the withdrawal is processed. The system checks the customer balance (as described in the balance request transaction); if the funds are insufficient, screen 8 is displayed. If the account balance is sufficient, screen 11 is displayed and the money is dispensed. The withdrawal amount is written to the unposted local ATM file, and the count of withdrawals per month is incremented. The balance is printed on the transaction receipt as it is for a balance request transaction. After the cash has been removed, the system displays screen 14.

When the No button is pressed in screens 10, 12, or 14, the system presents screen 15 and returns the customer's ATM card. Once the card is removed from the card slot, screen 1 is displayed. When the Yes button is pressed in screens 10, 12, or 14, the system presents screen 5 so the customer can select additional transactions.

Figure 1

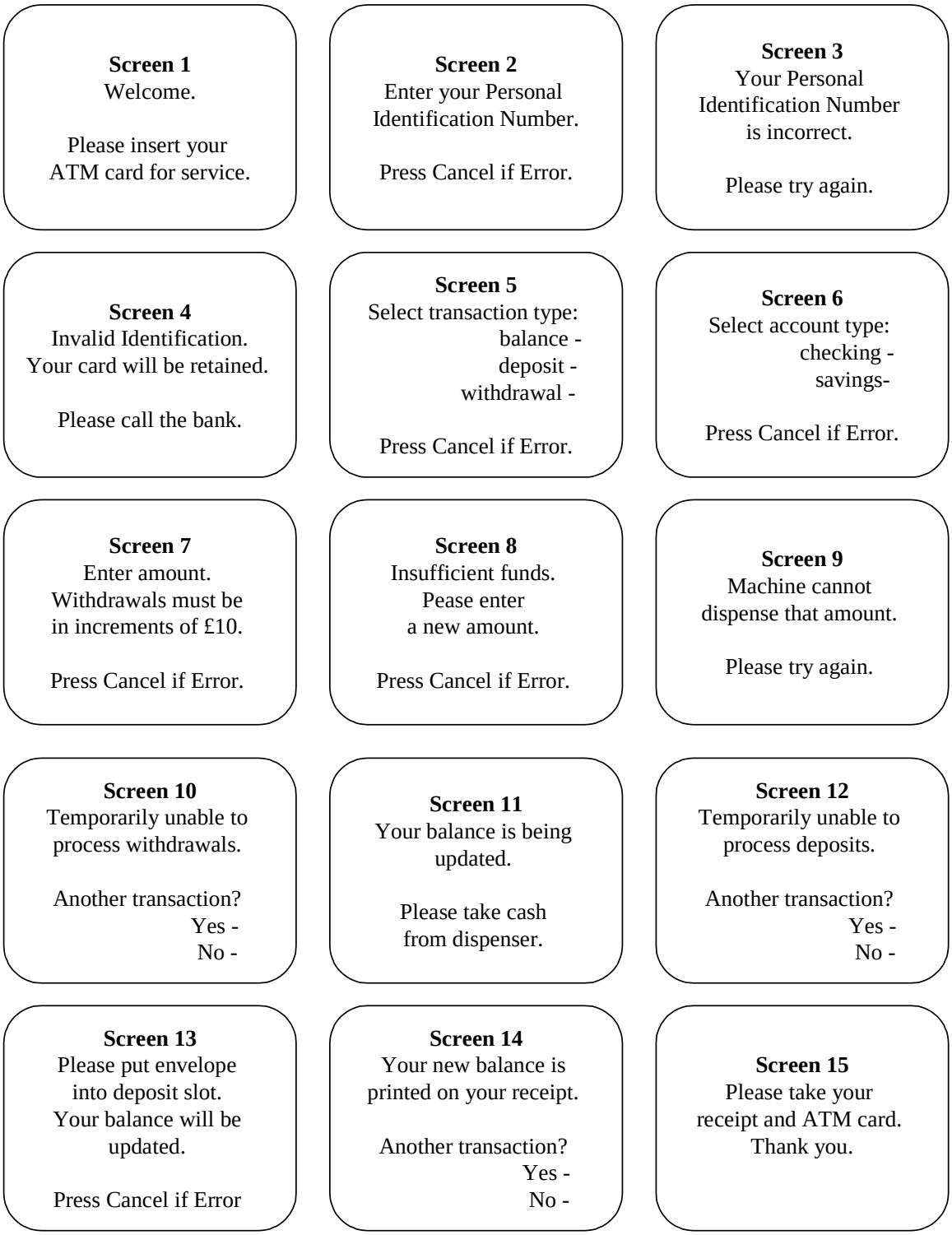
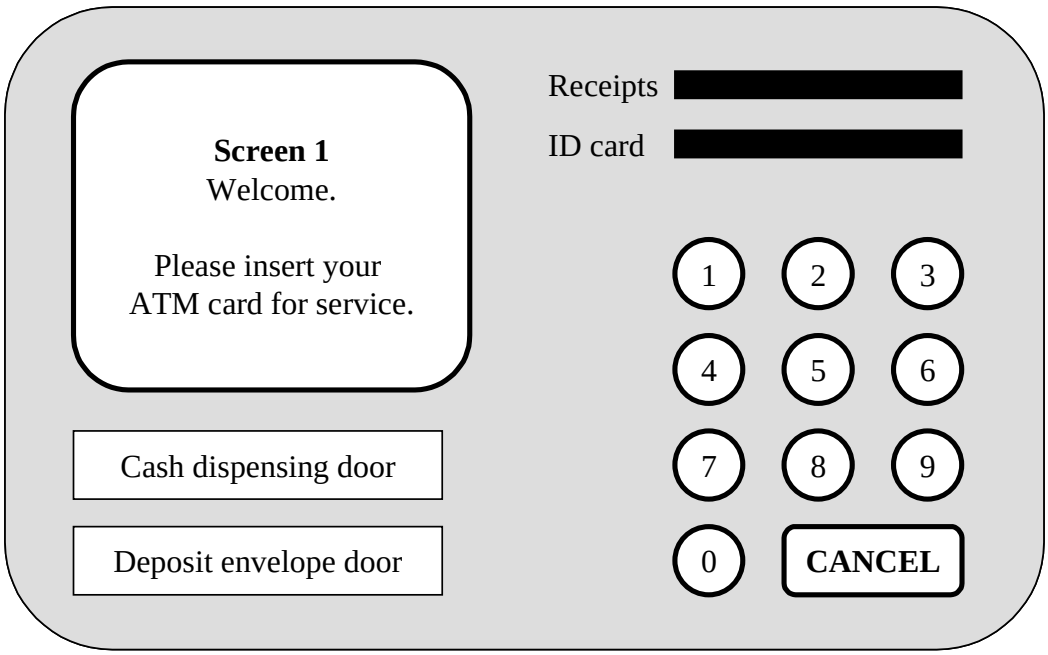

Screen 1
Welcome.
Please insert your
ATM card for service.
Screen 2
Enter your Personal
Identification Number.
Press Cancel if Error.
Screen 3
Your Personal
Identification Number
is incorrect.
Please try again.
Screen 4
Invalid Identification.
Your card will be retained.
Please call the bank.
Screen 5
Select transaction type:
balance -
deposit -
withdrawal -
Press Cancel if Error.
Screen 6
Select account type:
checking -
savings-
Press Cancel if Error.
Screen 7
Enter amount.
Withdrawals must be
in increments of £10.
Press Cancel if Error.
Screen 8
Insufficient funds.
Pease enter
a new amount.
Press Cancel if Error.
Screen 9
Machine cannot
dispense that amount.
Please try again.
Screen 10
Temporarily unable to
process withdrawals.
Another transaction?
Yes -
No -
Screen 11
Your balance is being
updated.
Please take cash
from dispenser.
Screen 12
Temporarily unable to
process deposits.
Another transaction?
Yes -
No -
Screen 13
Please put envelope
into deposit slot.
Your balance will be
updated.
Press Cancel if Error
Screen 14
Your new balance is
printed on your receipt.
Another transaction?
Yes -
No -
Screen 15
Please take your
receipt and ATM card.
Thank you.

Figure 2



Example

Top level Finite State Machine for an ATM terminal, PIN entry function