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SECTION A
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4TH SEMESTER

Note: Use any online tool of your choice to draw Data Flow Diagrams (DFDs) and Activity Diagram where required.

1: Video-Rental LTD case study
Video-Rental LTD is a small video rental store. The store lends videos to customers for a fee, and purchases its videos from a local supplier.

A customer wishing to borrow a video provides the empty box of the video they desire, their membership card, and payment – payment is always with the credit card used to open the customer account. The customer then returns the video to the store after watching it.

If a loaned video is overdue by a day the customer's credit card is charged, and a reminder letter is sent to them. Each day after that a further card is made, and each week a reminder letter is sent. This continues until either the customer returns the video, or the charges are equal to the cost of replacing the video.

New customers fill out a form with their personal details and credit card details, and the counter staff give the new customer a membership card. Each new customer's form is added to the customer file.

The local video supplier sends a list of available titles to Video-Rental LTD, who decide whether to send them an order and payment. If an order is sent, then the supplier sends the requested videos to the store. For each new video a new stock form is completed and placed in the stock file.
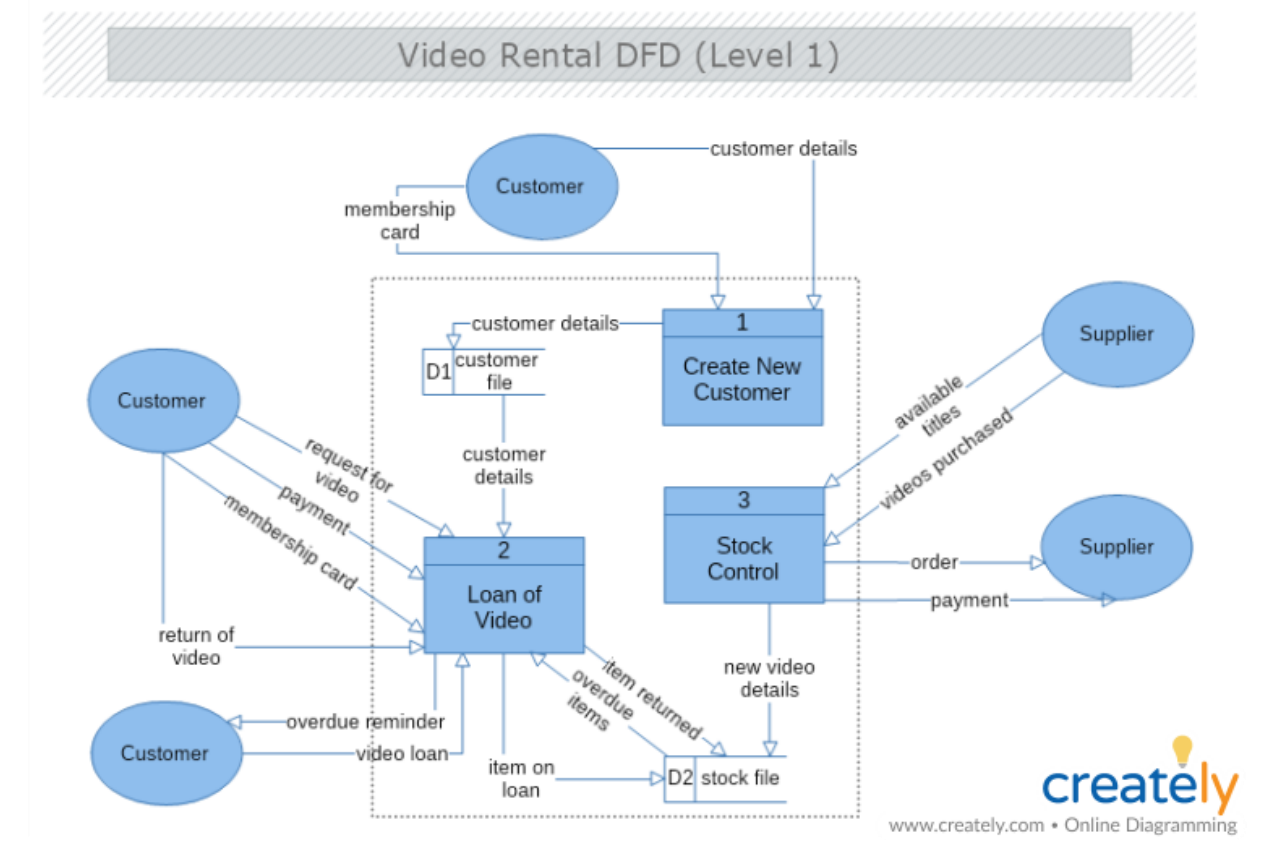
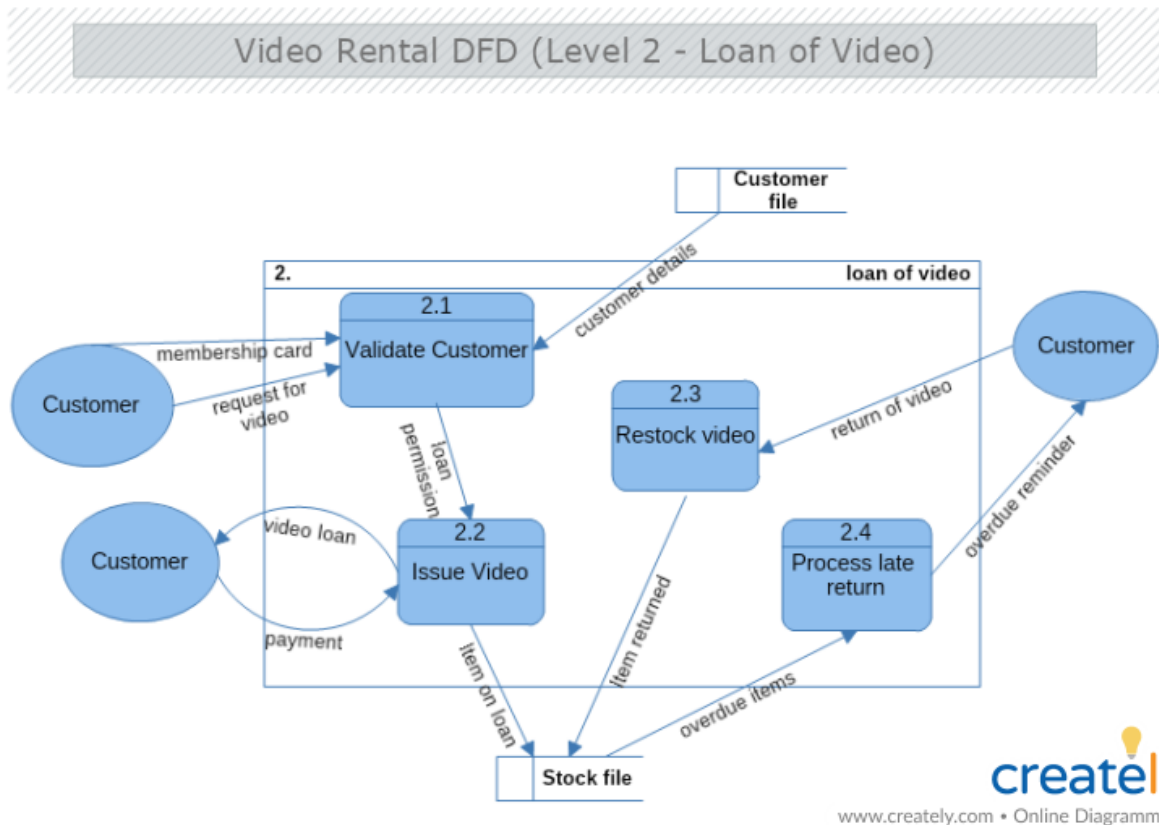**Q.1:** Draw a Context diagram for Video-Rental LTD?

Answer:
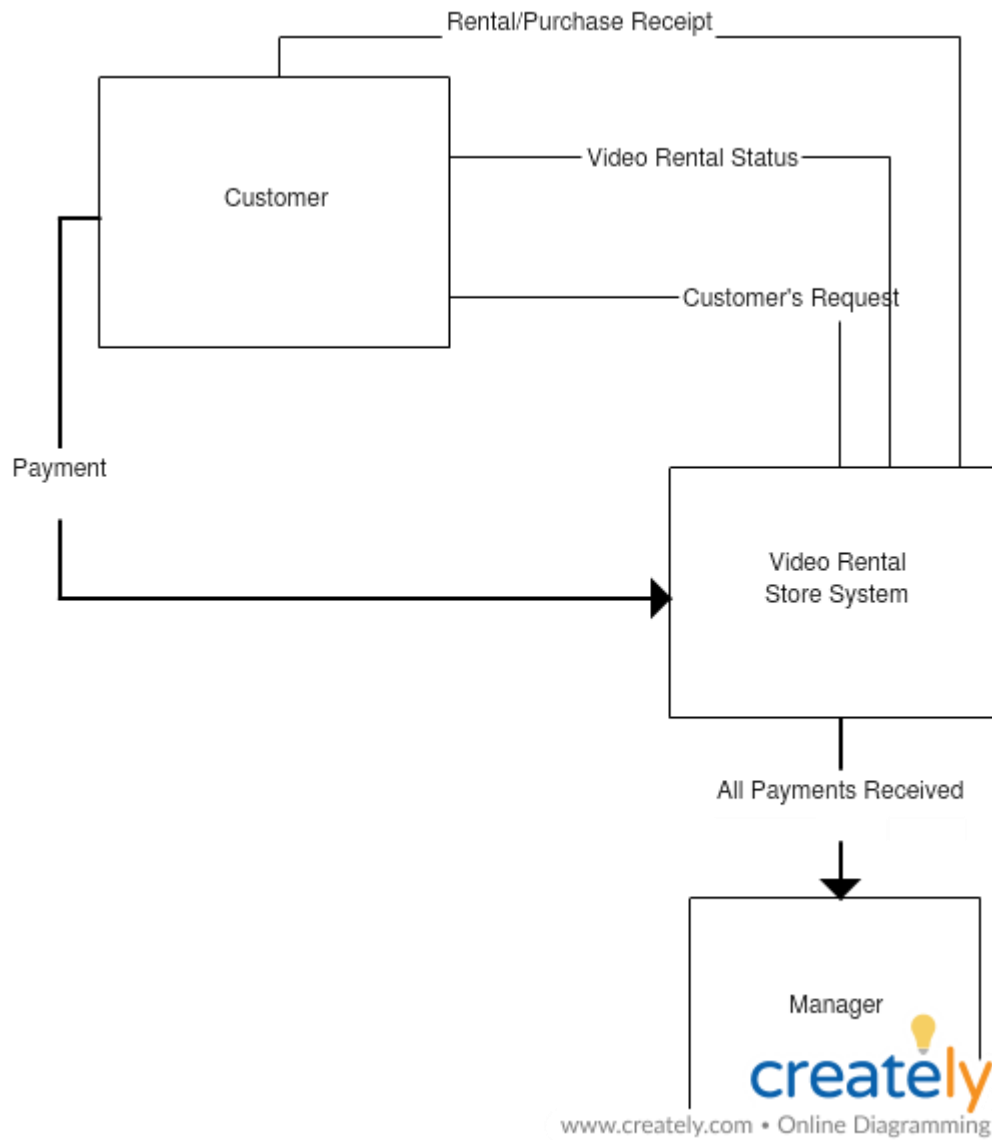
Q.2: Draw a Level 1 Data Flow Diagram (DFD) for the above case study?

Answer:

Q.3: Draw a Level 2 DFD for Video-Rental LTD case study stated above?

Answer:

Video Rental DFD (Level 2 - Loan of Video)

2: Estate Agency case study

Clients wishing to put their property on the market visit the estate agent, who will take details of their house, flat or bungalow and enter them on a card which is filed according to the area, price range and type of property.

Potential buyers complete a similar type of card which is filed by buyer name in an A4 binder.

Weekly, the estate agent matches the potential buyer's requirements with the available properties and sends them the details of selected properties.

When a sale is completed, the buyer confirms that the contracts have been exchanged, client details are removed from the property file, and an invoice is sent to the client. The client receives the top copy of a three-part set, with the other two copies being filed.

On receipt of the payment the invoice copies are stamped and archived. Invoices are checked on a monthly basis and for those accounts not settled within two months a reminder (the third copy of the invoice) is sent to the client.

Q: Create a Level 1 and Level 2 DFDs for this Estate Agency case study?

ANSWER: We should start with the context diagram, and create an 'empty' Level 1 DFD with all the same external entities and data-flows:
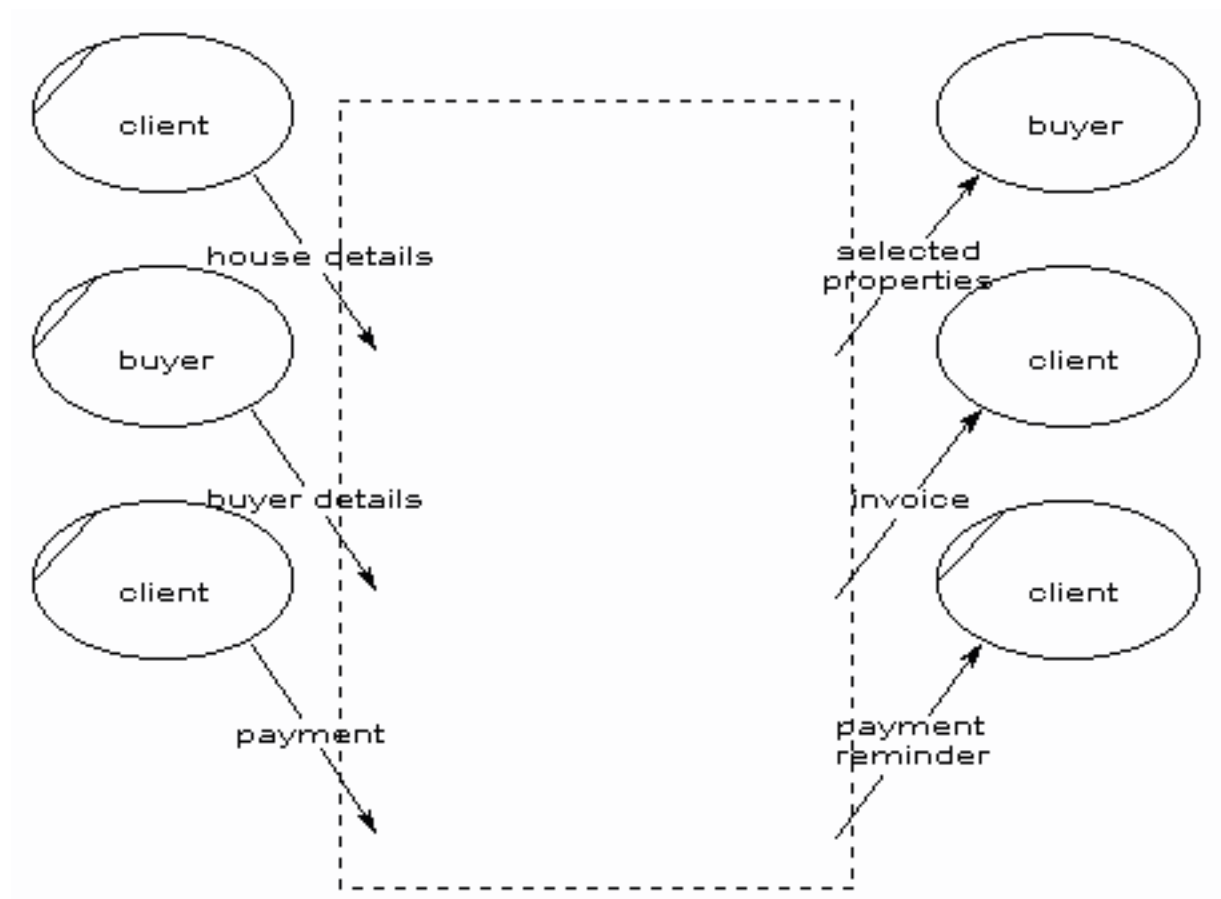
Draw the data-flows between the external entities and processes. We can now add these processes to the diagram, and connect the appropriate data-flows:
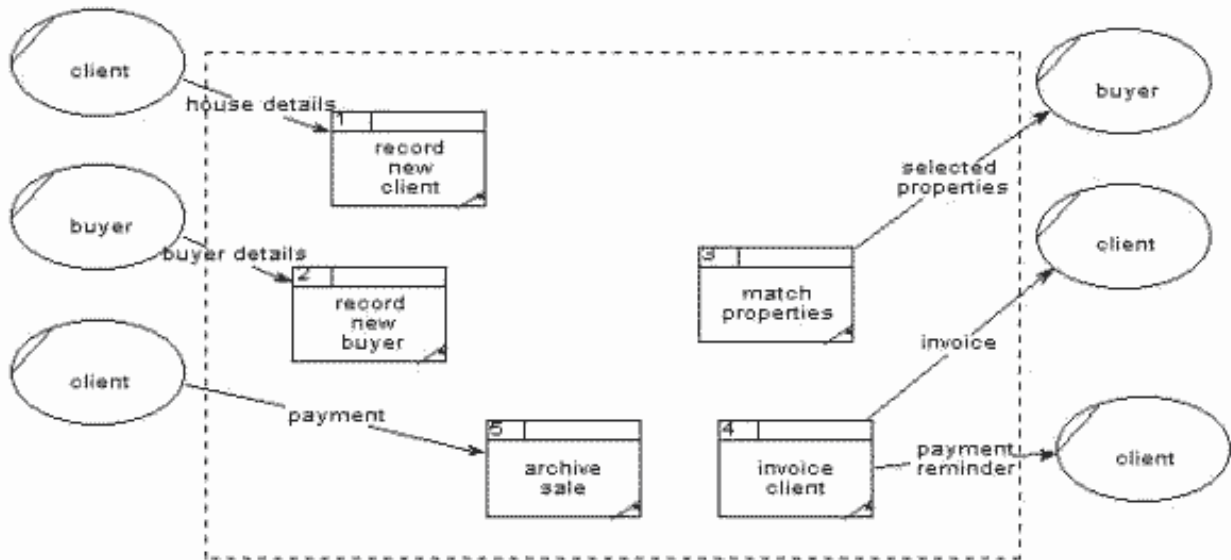
Identify data stores by establishing where documents / data needs to be held within the system. Add the data stores to the diagram, labelling them with their local name or description. There are two 'card' stores (clients and buyers) so these should be data stores 'property file' and 'buyer details'. A file need to be kept for the invoice copies 'invoices'. We can add these data stores to the diagram:
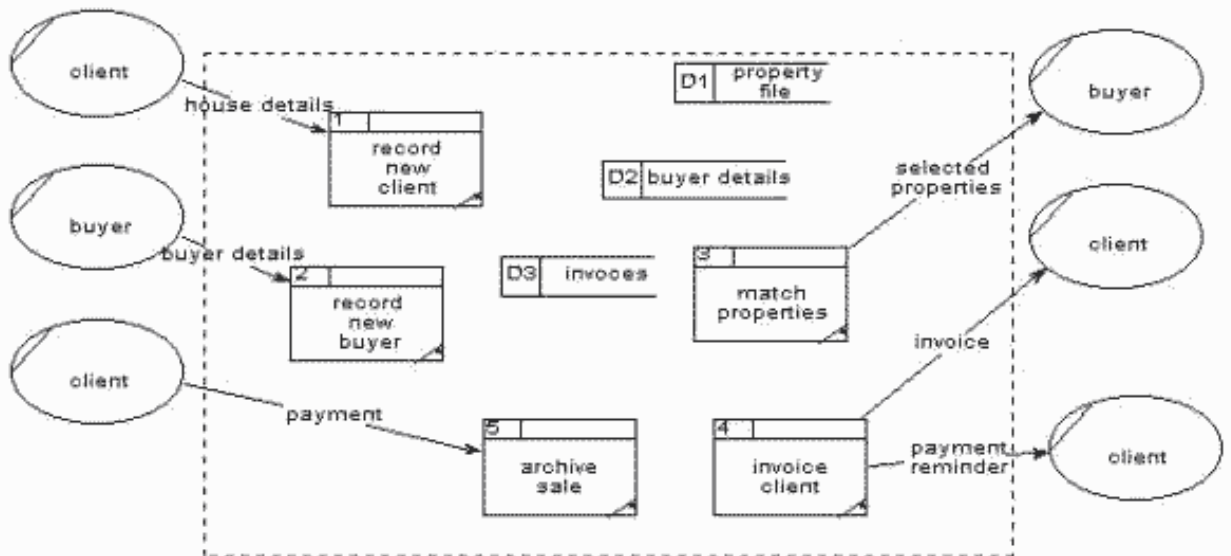
Add data-flows flowing between processes and data stores within the system. Each data store must have at least one input data-flow and one output data-flow (otherwise data may be stored, and never used, or a store of data must have come from nowhere!). Ensure every data store has input and output data-flows to system processes. Most processes are normally associated with at least one data store.

We can create a table to indicate which processes send and receive data from each data store:

These data-flows can be added to the diagram:
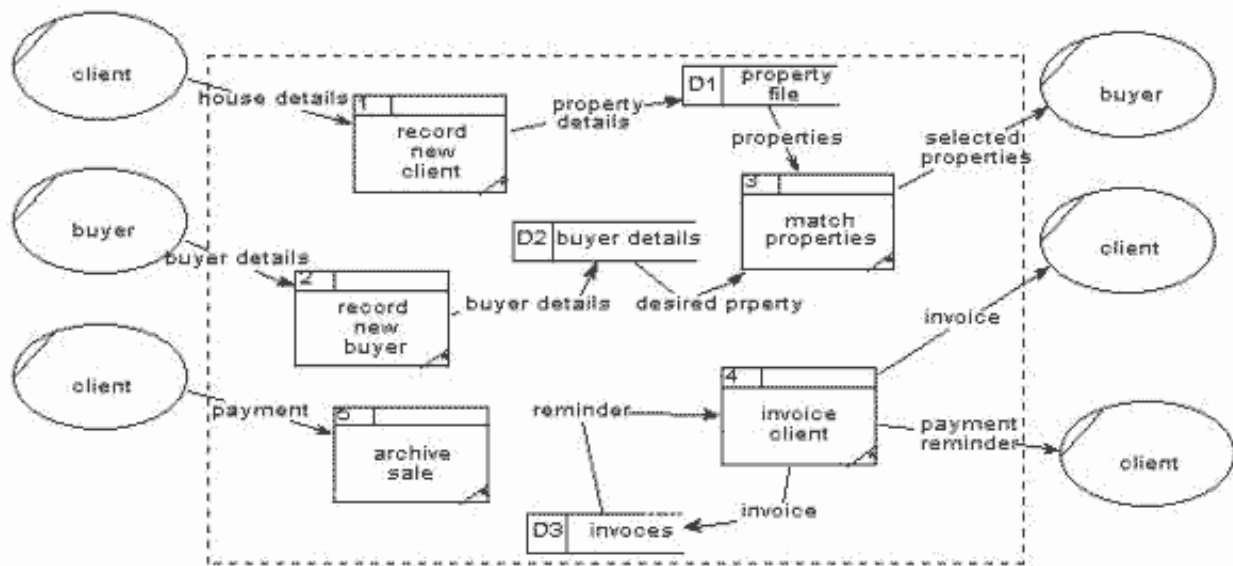
Check diagram. We now can check the diagram for correctness, and find a process that has no output data-flow 'archive sale'. An appropriate data-flow, into data store 'invoices' would be something like 'record of payment'. The consistent and balanced Level 1 DFD now looks as follows:
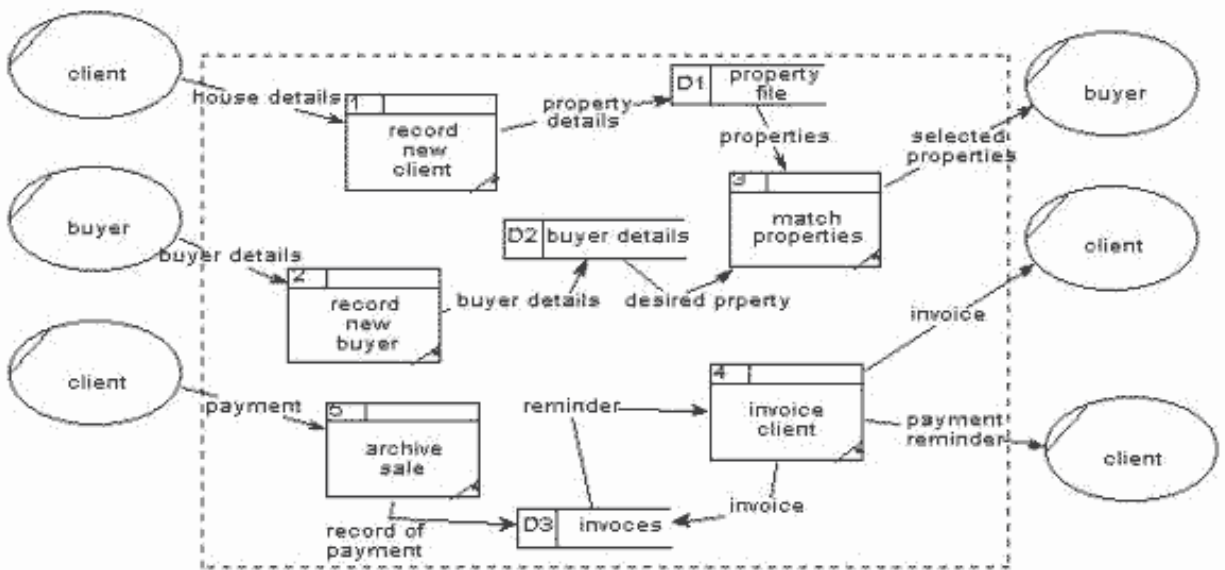
Our Level 1 DFD now looks as follows:
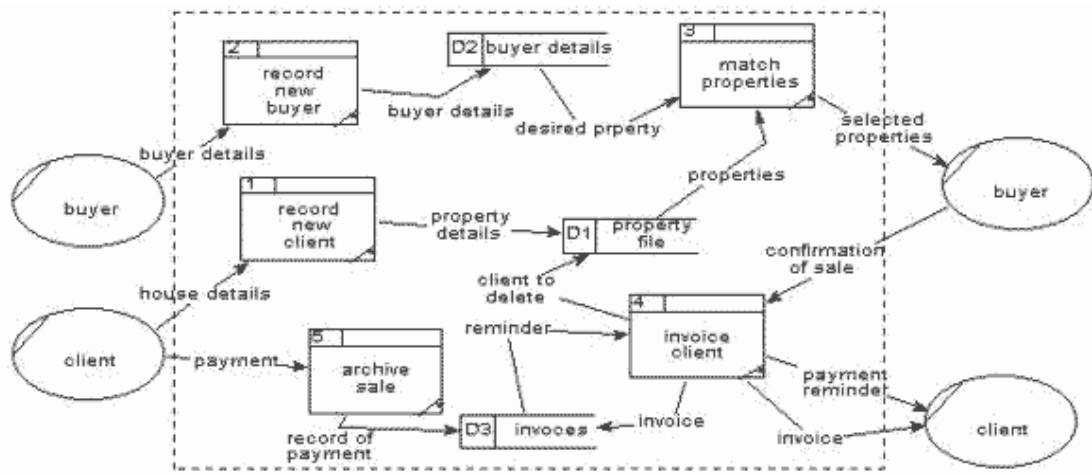
Our Level 2 DFD now looks as follows:
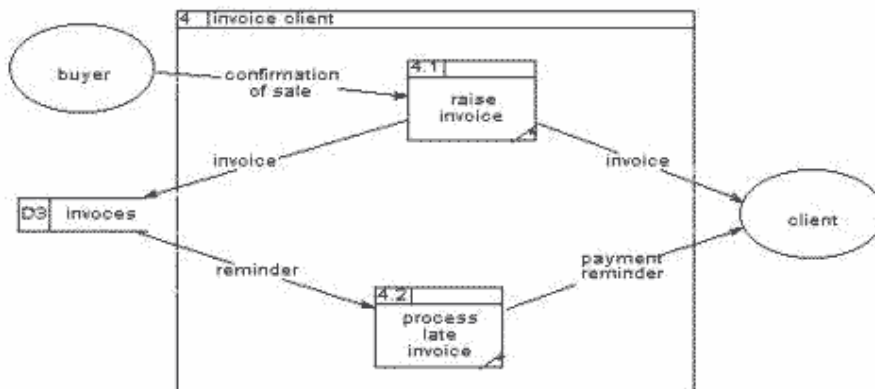
3: Based on your experience with a bank ATM, draw an activity diagram that models the data processing involved when a customer withdraws cash from the machine.

ANSWER:

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                                ┌──────────────┐      ┌──────────────┐      ┌──────────────┐      ┌──────────────┐
       ●  ──────────────────▶   │ User inserts │ ───▶ │ User inputs  │ ───▶ │ ATM verifies │ ───▶ │ User chooses │
  User Begins                   │    debit     │      │     pin      │      │  account and │      │  "Withdraw"  │
  Transaction                   │    card      │      │              │      │     pin      │      │              │
                                └──────────────┘      └──────────────┘      └──────────────┘      └──────────────┘
                                                                                                          │
                                                                                                          ▼
                       ┌──────────────┐         ┌─────────────────────────┐         ┌──────────────┐
       ◉  ◀──────────  │ ATM outputs  │ ◀─────  │ ATM verifies it has that │ ◀─────  │  User inputs │
  User has cash        │    cash      │         │ amount and that the      │         │  amount to   │
                       │              │         │ amount does not exceed   │         │  withdraw    │
                       └──────────────┘         │ user's daily allowance   │         └──────────────┘
                                                └─────────────────────────┘
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