

Newark Lawn Care

Sheldon White (SW) owns a lawn service business downtown Newark (DE) – Newark Lawn Care (NLC). Everything seems to go well – profit margins are high, employees are happy, customers are happy, etc. However, Sheldon is kind of in a panic mode since he is fully aware that he does not know what is going on – where to send his employees, which lawns to cut, who hasn't paid yet, does he owe money, has the equipment be serviced properly, etc. What NLC needs more than anything else is a world class information system. He asks you (ACCT-302) to help him. The first thing you do is interview him regarding his business and the information he needs to run his business. You find the transcript of the interview below.

ACCT-302 – Could you describe your business in a few sentences?

SW – We are a lawn service business. We take care of people's lawn for money. To run my business, I need labor (employees), equipment (e.g. mower), and transportation (trucks). I currently employ about 20 people, lease all my equipment, and have five trucks.

ACCT-302 – How do you find customers?

SW – I actually do have a small sales team. They contact people in the Newark area, distribute flyers, follow up references, etc. Let me briefly explain our reference system. We give a substantial discount if a customer references another customer and the latter signs a contract. Most customers do not provide references (< 20%). A few customers have given us more than one reference. Most customers that sign a contract with us have not been referenced by another customer (< 15%). Customers can be referenced only once (by another customer); we only consider the first reference we receive for a customer. We record all potential customers in our system – i.e., people we have contacted but have not signed a contract yet.

ACCT-302 – You mentioned the use of contracts. Please explain.

SW – Yes, we ask customers to sign contracts. There is exactly one customer per contract. We have a very high renewal rate (as I said, our customers are happy with our service). Most of our customers sign a new contract every year. We never cut a lawn (i.e. provide a service) without having a contract. Most contracts are signed (and recorded into our system) days or weeks before the first service. In addition, we would like to record the following information regarding contracts. First, we need to specify the property or properties that need lawn care. It is impossible to record a contract without recording its properties. We only record the properties that we service (and thus for which a contract exists). We work with one-year contracts and the contracts need to be renewed for each property every year. Second, we need to record the contract period: start date and end date. Third, the contract needs to record the (fixed) price per lawn service. The price is determined by the size and the location of the property (or properties). Fourth, the manager assigned to the contract needs to be recorded. There is exactly one manager per contract. Most of our managers manage more than one contract.

ACCT-302 – I am somewhat confused now. You mentioned salespeople before and now you are talking about managers. I guess that they are different people (employees).

SW – Yes. A salesperson is the employee whose job it is to find customers and have them sign a contract. When a contract is signed (and recorded), we record the salesperson. There is exactly one salesperson per contract. It sometimes takes more than two weeks to find a manager for a contract (after it has been signed). Obviously, we will have manager information for most contracts (>98%). Employees who are salespeople can not be managers and vice versa. We expect salespeople to sign at least 20 (!) contracts every year.

ACCT-302 – You already mentioned “service” but I don’t really understand what it means.

SW – Ok, let me first explain what we mean by service. At NLC, a service is the cutting of the lawn as specified by the contract – what property or properties and at what price. Depending on the weather, there are somewhere between thirty and forty services per contract. There is exactly one contract per service. In essence, you need three things to cut a lawn (and thus a service): labor, transportation, and equipment. Having good equipment is essential in our business. However, you also need people to operate the equipment and transportation to bring equipment and people to the properties. Examples of equipment include tractors, trimmers, blowers, etc. We use trucks to transport equipment and employees to the properties. NLC owns five trucks. For now, all I want to know is how the trucks are being used – for what services? Our trucks are being used for hundreds of services. We only consider trucks that have been used for at least one service. We need transportation (and thus a truck) for every service. For some services we need more than one truck. Further, we need employees that operate the equipment. We use two or more employees for most services. It is impossible to have a service without an employee. The same employee can cut more than five lawns a day (5 services). Salespeople or managers never cut lawns (and are thus not involved in services).

ACCT-302 – So, I have two more questions now: (1) How do customers pay for your services, and (2) What information do you want to record regarding equipment?

SW – Let’s talk about payments first. At the end of the month, we ask customers to pay for all services we performed that month. We ask them to pay the full amount within thirty days; no installments. Some of our customers pay a fixed amount at the beginning of the year that covers all their expenses. We give a substantial discount for such prepayments. We need to record who pays. There is exactly one customer per cash receipt. We immediately deposit all checks from customers into one account (the same account). It is impossible to record a cash receipt without recording its account. We actually opened a second account last month but we haven’t used it yet (no deposits or cash receipts; no withdrawals or cash disbursements). Obviously, we have recorded payment (cash receipt) information for most services (>95%).

ACCT-302 – Ok, what about equipment?

SW – Well, there is a lot of information we need to record regarding equipment. First, at least one piece of equipment is required for each service. Most pieces of equipment are

used for thousands of services. We leased a tractor earlier this month that we haven't used in a service yet. Second, we lease all our equipment. We need to record the leases for each piece of equipment. Most leases are for 1, 2, or 3 years. We do have two tractors that we are leasing for five years. We need to record a separate lease for each piece of equipment. We lease equipment exclusively; i.e., we don't lease anything else. Last month, we renewed the lease for one of our tractors (we got a really good deal). Third, we need to know from whom we leased a piece of equipment; the vendor. There is exactly one vendor per lease. We lease the two tractors mentioned above (with the 5 year leases) from the same vendor. We record all vendors in the Newark area that lease equipment (and there are many more than you might think). We have done business with less than 15% of them. Fourth, our payment policies vary with vendors; we choose the policy that is most beneficial to us. Sometimes we pay at the beginning of the lease period, sometimes we pay at the end of the lease period, sometimes we pay the full amount, sometimes we use installments, sometimes we make prepayments, sometimes we pay for multiple leases with one check, ... , anything goes! Again, we use the same account for deposits and withdrawals. There is exactly one (cash) account for each cash disbursement. There is exactly one vendor for each cash disbursement. Obviously, there can be more than one payment for the same vendor. Mmmm , I might have given you more information than you asked for.

ACCT-302 – No, this is perfect. Any maintenance required for equipment?

SW – Yes, I am happy you ask! This is very important information that we need to store in our information system. Proper maintenance is a requirement for all leased equipment. Here is how we do it. We have created a list with the different equipment types that we use – tractors, trimmers, blowers, etc. There is exactly one “equipment type” for each piece of equipment. As mentioned above, we have multiple tractors. One of the equipment types in our system is “push lawn mower.” However, we have never leased one and we thus don't have one. We might lease one down the road. For each “equipment type” we have determined what “types of maintenance” are required and how frequent. We call this the “schedule” and we follow it very strictly. The schedule information tells us what maintenance types we need and when (frequency). Examples of maintenance types include: oil service, sharpen, etc. We have a different (maintenance) schedule (and thus frequency) per “equipment type” per “service type.” There is at least one schedule per equipment type. There is exactly one equipment type per schedule. There is at least one schedule per “maintenance type.” There is exactly one “maintenance type” per schedule. We have a brand new tractor that hasn't required maintenance yet. However, some of our older tractors have had maintenance hundreds of times. There is exactly one piece of equipment per maintenance. At least one “maintenance type” is required per maintenance. We want to record all possible “maintenance types” in our system, even when we don't need them.

ACCT-302 – Who performs the maintenance and how do you pay for maintenance?

SW – We actually work with authorized service centers; very complicated. Could we simply ignore this information for now?

ACCT-302 – Sure!

ASSIGNMENT

- Define the E-R model. Define all entities, relationships, and cardinalities.
- Define all relationship attributes.
- You don't have to define the entity attributes.
- Define the relational database structure

ATTRIBUTES

Contract-#	Service-ticket-#	Contract-price
Employee-number	Cash-description	CashReceipt-amount
CashReceipt-rano	Cash-number	Property-id
Lease-CashDisbursement-amount	Customer-name	Truck-description
Equipment-code	Contract-end-date	Employee-address
Customer-code	Service-date	Employee-date-hired
Contract-start-date	Truck-model-name	EquipmentType-code
Lease-start-date	Employee-name	Contract-description
Lease-end-date	MaintenanceType-code	Customer-address
Customer-tel	Truck-code	Property-address
Property-description	CashReceipt-date	Vendor-address
Vendor-id	Maintenance-code	CashDisbursement-date
MaintenanceType-description	Lease-description	Maintenance-description
Maintenance-MaintenanceType-cost	Equipment-description	Lease-id
CashDisbursement-check#	Vendor-name	Schedule-code
EquipmentType-description	Lease-amount	Schedule-frequency
Service-start-time	Service-end-time	
Maintenance-MaintenanceType-duration		