红色：类/对象

蓝色：数据成员

绿色：行为（成员函数）

As an employee of a large international courier and shipping service快递服务, Bill Wiley met almost every day with many companies that shipped投递 and received packages. He was frequently asked if his company could deliver local packages on the same day. Over several months, he observed that there appeared to be a substantial大量的 need for courier services in the city in which he lived. He decided that he would form his own courier delivery company called On the Spot to fill this need.

Bill began by listing his mobile telephone number in the Yellow Pages. He also sent letters to all those companies that had requested same-day courier service that his prior company had not been able to serve. He hoped that, through good service and word-of-mouth 口耳相传advertising, his business would grow. He also began other advertising and marketing activities to promote促销 his services.

At first, Bill received delivery requests on his business mobile phone. However, it was not long before his customers were asking if he had a Web site where they could place orders for shipments. He knew that if he could get a Web presence he could increase his exposure曝光度，知名度 and help his business grow.

After he had been in business only a few short months, Bill discovered he needed to have additional help. He hired another person to help with the delivery and pickup取货 of packages. It was good to see the business grow, but another person added to the complexity of coordinating使协调 pickups and deliveries. With the addition of a new person, he could no longer “warehouse存储” the packages out of his delivery van卡车. He now needed a central warehouse仓库 where he could organize and distribute分发 packages for delivery.

He thought that if his business grew enough to add one more delivery person he would also need someone at the warehouse to coordinate the arrival and distribution of all the packages.

**The details of the package pickup and delivery process are described here.**

When Bill got an order, at first, only on his phone, he recorded when he received the call and when the shipment would be ready for pickup. Sometimes, customers wanted immediate pickup; sometimes, they were calling to schedule a later time in the day for pickup.

Once he arrived at the pickup location, Bill collected the packages. It was not uncommon for the customer to have several packages for delivery. In addition to the name and address of the delivery location, he also recorded the time of pickup. He noted the desired delivery time, the location of the delivery, and the weight of the package to determine the courier cost. When he picked up the package, he printed out a label with his portable printer用便携式打印机打印一张标签 that he kept in the delivery van.

At first, Bill required customers to pay at the time of pickup, but he soon discovered that there were some regular customers who preferred to receive a monthly bill for all their shipments. He wanted to be able to accommodate those customers. Bills were due and payable upon receipt.

To help keep track of all the packages, Bill decided that he needed to scan each package as it was sorted in the warehouse. This would enable him to keep good control of his packages and avoid loss or delays.

**The delivery of a package was fairly simple.**

Upon delivery, he would record information about when the delivery was made and who received it. Because some of the packages were valuable, it was necessary in those instances to have someone sign for签名 the package.

On the Spot courier services grew and changed over the years. At first, Bill received requests for package pickups on his mobile phone, recorded that information in a log日志, and would then drive around to retrieve取 all the packages later in the day. However, he soon discovered that with another driver, it was difficult to coordinate pickups between the two of them from his van. It was not long before he reorganized his business and turned the warehouse employee into a driver. Then, he stayed in the warehouse himself, and his two employees made all the pickups and deliveries. This worked well because he could control and coordinate the pickups and deliveries better. It was also easier for him to receive pickup requests working at a desk rather than trying to do it while driving a delivery van.

**As he thought about how his business was growing and the services he provided to his customers, Bill began to itemize分条列举 the kinds of information he would need to maintain.**

Of course, he needed to maintain information about his customers. Some of his customers were businesses; some were individuals. He needed to have basic address and contact information for every customer. Also, for his corporate customers公司客户, he needed to identify a primary contact person. It was mostly his corporate customers who wanted to receive monthly statements listing all their shipments during the month and the total cost. Bill needed to distinguish which customers paid cash and which wanted monthly statements. In fact, for those that paid monthly, he needed to keep a running account of such things as when they were last billed最后一次开账单？的时间, when they paid, and any outstanding balances未清余额. Finally, when payments were received, either for individual shipments or from monthly invoices发票/单据, he needed to record information about the payment: type of payment, date, and amount. Although this was not a sophisticated精致的 billing and payment system, Bill thought it would suffice足够 for his needs.

Next, he started thinking about his packages and shipments. At the time that a request for a pickup came in, he needed to keep track of it as some type of delivery request or delivery order. At that point in time, Bill mostly needed to know who the customer was, where the pickup location was, and what date and time the package(s) would be ready for pickup. He also recorded the date and time that he received the order. A delivery order was considered “open” until the delivery van arrived at the pickup location and the packages were all retrieved取回. At that point, the delivery order was satisfied.

Once the packages were retrieved, each package needed to be uniquely identified. Bill needed to know when it was picked up and which delivery person picked it up. Other important information was the “deliver to” entity name and the address. He also needed to identify the type of delivery. Some packages were high priority, requiring same-day delivery. Others were overnight. Of course, the weight and cost were recorded so the customer could either pay or have it added to the monthly invoice.

In the courier and delivery business, one of the most important information requirements is the date and time stamp. For each package, it is important to know when it was picked up, when it arrived at the warehouse, when it went back out on the delivery run, and when it was delivered. When possible, it is also important to have names associated with each of these events.

As On the Spot Courier Services continues to grow, Bill discovers that he can provide much better services to his customers if he utilizes利用 some of the technology that is currently available. For example, it will allow him to maintain frequent communication with his delivery trucks, which could save transportation and labor costs by making the pickup and delivery operations more efficient. This would allow him to serve his customers better. Of course, a more sophisticated system will be needed, but Bill’s development consultant has assured him that a straightforward and not- too-complex solution can be developed.

Here is how Bill wants his business to operate.

Each truck will have a morning and afternoon delivery and pickup run. Each driver will have a portable digital device with a touch screen. The driver will be able to view his or her scheduled pickups and deliveries for that run. (Note: This process will require a new use case—something the Agile development methodology predicted would happen.) However, because the trucks will maintain frequent contact with the home office via telephony Internet access, the pickup/delivery schedule can be updated in real time—even during a run. Rather than maintain constant contact, Bill decides that it will be sufficient if the digital device synchronizes with the home office whenever a pickup or delivery is made. At those points in time, the route schedule can be updated with appropriate information.

Previously, customers were able to either call On the Spot and request a package pickup or visit the company’s Web site to schedule a pickup. Once customers logged in, they could go to a Web page that allowed them to enter information about each package, including “deliver to” addresses, size and weight category information, and type of service requested. On the Spot provided “three hour,” “same day,” and “overnight” services. To facilitate customer self-service, On the Spot didn’t require exact weights and sizes, but there were predefined size and weight categories from which the customer could choose.

Once the customer entered the information for all the packages, the system would calculate the cost and then print mailing labels and receipts. Depending on the type of service requested and the proximity of a delivery truck, the system would schedule an immediate pickup or one for later that day. It would display this information so the customer would immediately know when to expect the pickup.

Picking up packages was a fairly straightforward process. But there was some variation in what would happen depending on what information was in the system and whether the packages were already labeled. Upon arriving at the scheduled pickup location, the driver would have the system display any package information available for this customer. If the system already had information on the packages, the driver would simply verify that the correct information was already in the system for the packages. The driver could also make such changes as correcting the address, deleting packages, or adding new packages. If this were a cash customer, the driver would collect any money and enter that into the system. Using a portable printer from the van, the driver could print a receipt for the customer as necessary. If there were new packages that weren’t in the system, the driver would enter the required information and also print mailing labels with his portable printer.

One other service that customers required was to be able to track the delivery status of their packages. The system needed to track the status of a package from the first time it “knew” about the package until it was delivered. Such statuses as “ready for pickup,” “picked up,” “arrived at warehouse,” “out for delivery,” and“delivered” were important. Usually, a package would follow through all the statuses, but due to the sophistication of the scheduling and delivery algorithm, a package would sometimes be picked up and delivered on the same delivery run. Bill also decided to add a status of “cancelled” for those packages that were scheduled to be picked up but ended up not being sent.

随着现场快递服务的不断增长，比尔发现，如果他利用目前可用的一些技术，他可以为客户提供更好的服务例如，这将使他能够与他的送货卡车保持频繁的通信，这可以通过提高皮卡和送货操作的效率来节省运输和劳动力成本这样可以让他更好地为顾客服务当然，需要一个更复杂的系统，但比尔的开发顾问向他保证，可以开发一个简单而不太复杂的解决方案。

比尔希望自己的生意能这样做。

每辆卡车将有一个上午和下午的交货和皮卡运行每个司机都有一个带触摸屏的便携式数字设备司机将能够查看他或她的预定的皮卡和运输运行（注意：这一过程将需要一个新的用例，敏捷开发方法预测将发生这种情况。）但是，由于卡车将通过电话互联网访问与总部保持频繁联系，因此即使在运行期间，也可以实时更新取货/交货计划比尔决定，无论何时取货或送货，只要数字设备与内政部同步，就足够了，而不是保持经常联系在这些时间点，可以用适当的信息更新路线计划。

此前，客户可以当场打电话要求提货，也可以访问公司网站安排提货客户登录后，可以转到一个网页，该网页允许他们输入有关每个包裹的信息，包括“送货地址”、大小和重量类别信息以及所请求的服务类型现场提供“三小时”、“当天”和“过夜”服务为了方便客户自助服务，现场不需要精确的重量和尺寸，但有预定义的尺寸和重量类别供客户选择。

一旦客户输入所有包裹的信息，系统将计算成本，然后打印邮寄标签和收据根据所要求的服务类型和送货卡车的接近程度，系统将安排一个即时的拾取或一个为以后的那一天。它会显示此信息，以便客户立即知道何时可以取货。

取包裹是一个相当简单的过程但是，根据系统中的信息以及软件包是否已经被标记，会发生什么情况有一些变化到达预定取货地点后，驾驶员将让系统显示该客户可用的任何包裹信息如果系统已经有了包的信息，驱动程序只需验证系统中已经有了包的正确信息驱动程序还可以进行诸如更正地址、删除包或添加新包等更改如果这是一个现金客户，司机会收取任何钱并将其输入系统司机可以使用面包车上的便携式打印机，根据需要为客户打印收据如果系统中没有新的软件包，驱动程序将输入所需信息，并使用便携式打印机打印邮件标签。

客户需要的另一项服务是能够跟踪包裹的交付状态系统需要跟踪包裹的状态，从第一次“知道”包裹到包裹交付“准备提货”、“提货”、“到达仓库”、“发货”和“已发货”等状态非常重要通常，包会跟踪所有状态，但由于调度和传递算法的复杂性，有时包会在同一个传递运行中被拾取和传递比尔还决定为那些计划提货但最终没有寄出的包裹添加一个“取消”状态。