Project#3: activity monitoring

The software house OnTimeSoftware develops software on contract, usually at fixed time, fixed price, and with specified functionality and quality. One of the hardest problems is to detect early on that an activity will take longer than expected. If you can detect it early, it is possible to help the developer currently carrying out the activity, for instance by letting a seasoned expert review the work and offer guidance. If you detect the problem late, the activity may have run off the track, be costly to correct, and it will soon hamper many other activities.

Seasoned project managers know that they can get an early warning in this way: The developer responsible for a given activity records every day how many hours he has worked on the activity, and every weekend he gives an estimate of the remaining number of hours. Project management now computes an estimate of the total number of hours for the activity:

total expected = hours spent + hours remaining

In a straightforward activity this figure remains constant from week to week, and when no hours remain, it is finished. If the figure starts increasing, something is wrong, and help is most likely needed. Experience is that the problem in this way can be detected between 60% and 80% into the activity, while it otherwise tends to be detected when more than the total expected time has been used.

Unfortunately, the procedure is cumbersome to manage, and company management wants to support it with an IT system. At the same time they want a better record of the work hours per activity, which many developers at present record many days too late. The recording is at present also used for billing some of the customers, and for collecting experience data of hours used for various sizes of projects.

When staffing a project, department managers and project managers have troubles getting an overview of who will be available in the period where the project is carried out. They expect the system to give them an overview of this too.

Specification

OnTimeSoftware has around 80 developers and around 40 open projects with around 800 planned or running activities. Many projects run for just a few months, but some run for a couple of years. Most developers work on less than 10 activities at a time, but a few may work on more than 20 each week.

Each project consists of a set of activities, usually planned weeks before they start. An activity is primarily carried out by a single developer - responsible for this activity - but sometimes other developers may assist for some hours. OnTimeSoftware has experienced that project management is much harder if more than one person is allocated to an activity. So they take

great care dividing projects into activities for a single person. There is also a special 'overhead' project that consists of activities such as vacation, illness, lunch and courses.

Developers must on a daily basis record how much time they have spent on their activities - with an accuracy of half an hour. The system must remind them if they have forgotten. This recording is presently considered annoying, and it is crucial that the system makes it easy. For instance it must be easy to find the proper activity numbers.

Developers must once a week (Friday or Monday) give an estimate of the remaining time for all activities that they are responsible for. Again, the system must remind them if they forget. When the responsible developer reports that the remaining time is zero, the activity is finished and he doesn't have to report remaining time any more.

The project manager (or any other developer) must be able to create projects and activities, and nominate a responsible developer for each activity. To do this, he must be able to see when this developer will be available. He must be able to see how the hours spent and the estimated total develop over time. It is particularly important to identify activities that have a growing estimated total or where little work is done. Finally, he must be able to see who is responsible for this activity and what else this developer is supposed to work on.

Project managers and department managers will typically monitor several projects in this way. It would be convenient if they can get a good overview of the projects they watch particularly closely.

Assumptions

Employees use initials of up to four letters and people usually know each other's initials. The company has already a system that records all employees, invoices customers based on hours used, collects experience data, plans projects with a Gantt diagram, etc. There is no reason to deal with these issues in this project.

Projects have a number and a name, e.g 9511DXP version B.

An activity is denoted by the project number and an activity number. Furthermore, it has a name, e.g.

9511-12 Design of communication module.

Your job is to develop alpha version of the proposed system for the activity monitoring. This system should take into account the sides of the developers and the project manager.

Assume that the system runs on the web platform or mobile devices. Please add the model of authentication system before starting the dialogue with users before they have been logged on. For the alpha testing you can use the existing (or created) user data from database so that the system should know who the user is.