

# 10

# Project Resource Management

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## Learning objectives

By the time you have completed this chapter you should be able to:

- Understand the types of resources
- Estimate the resource needs
- Design the project staffing plan
- Develop a schedule constrained by time
- Develop a schedule constrained by resources
- Construct a multi-project resource schedules

## Introduction

The project schedules cannot be finalised until the resources have been allocated to them. A resource can be any entity required to accomplish a project. This includes all the people working on the project, equipment required to perform tasks within the project and any materials required to achieve the project deliverables. All resources have costs associated with them which determine if the project is viable in the first instance. It is the project manager's responsibility to estimate the level of resources required for the project. However, certain constraints maybe outside the project manager's control. This includes the availability of resources, time constraints of the project and the availability of project funds. This chapter begins by discussing the different approaches to resource management, before investigating the resource constraints imposed on a project.

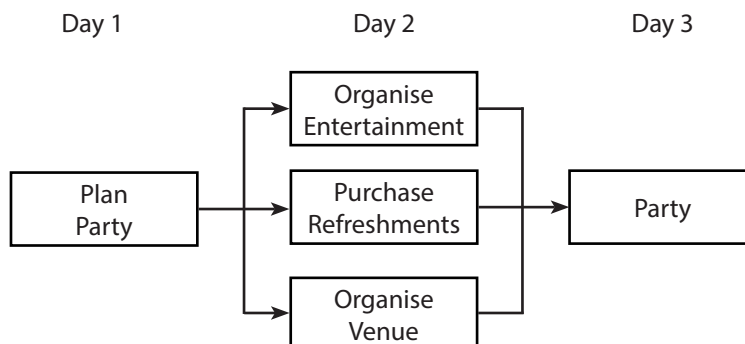
## 10.1 Types of required resources

Project resource scheduling involves determining the type of resource required for each work package, in terms of people, equipment and material; determining the quantity of resources required for each work package; and identifying when utilisation of each resource is required. Project resource scheduling must therefore be closely co-ordinated with project cost estimating.

When preparing a schedule, we generally make a mistake by assuming that all resources will be available when required, that there is an unlimited supply of resources and that the required resources are affordable. In reality, resources are limited in supply and availability. A particular problem for project managers is the need for specialist resources. These tend to be scarce, expensive and availability rarely coincides with the preferred schedule. When faced with the challenges and constraints of scheduling resources, it may be necessary to schedule activities not at the earliest start date, but rather at a time that suits the availability of resources or the maximises efficiency of resource usage. Otherwise projects may fail to achieve the project deadline schedule, as illustrated in the following example:

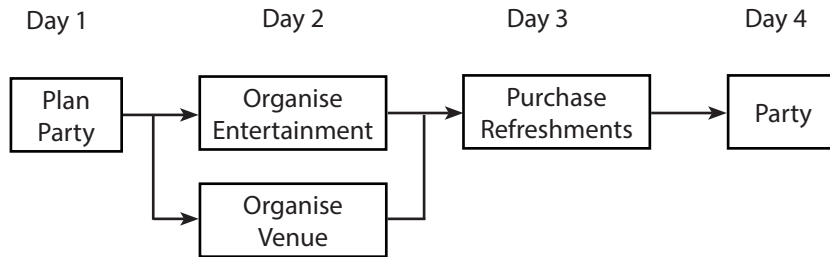
### Example 10.1

Consider the example of three friends planning a huge party to celebrate their graduation and award of degree. With all three resources available to work on the project, the earliest day the party can occur will be day 3, as shown in figure 10.1.



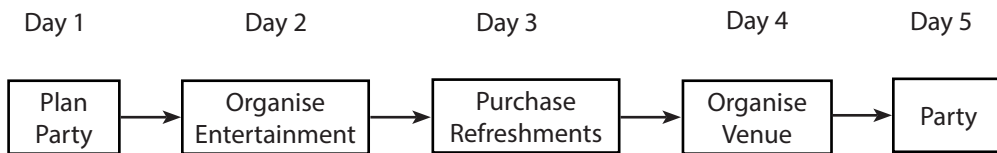
**Figure 10.1:** Three available resources

Now let us assume that one of the friends decide to have an alternative arrangement for his celebrations. This would result in only two available resources and the completion date of the party extending to four days.



**Figure 10.2:** Two available resources

Finally let us assume that a second friend chooses not to be involved in the party. This would result in only one available resource and all activities being performed in a series. As a consequence the project would now take five days to complete.



**Figure 10.3:** One available resource

## 10.2 Estimating resource needs

The action that the project manager takes to manage the constraints imposed by a resource is dependent on the schedule constraints of the project. In terms of scheduling there exist two types of project constraints: time constrained projects and resource constrained projects

### ■ Time constrained projects

Projects that are constrained by time must be completed by a fixed date. It may be necessary to acquire additional resources in order to achieve the deadline, although this does increase the risk of cost overrun. Time constrained projects have three objectives:

- 1 To maintain the project completion date.
- 2 To determine the resource requirements so that they will be available at the right time.
- 3 To schedule each activity so that the resource usage is as smooth as possible.