Chapter 7 Risk management

Further exercise pointers

1. *Fiona is a final year computing undergraduate student who in her third year undertook a placement with the IT department of an insurance company as a support analyst and then a network manager. The placement year was very busy and rewarding as the company saw IT as providing business advantage in a what was a very dynamic and aggressively competitive sector. The project that Fiona proposes to do in her final year will use the insurance company as a client. The proposed project involves gathering requirements for an application that records details of change requests for operational systems made by users and then tracks the subsequent progress of the change. Having gathered the requirements she is to design the application, then build and implement it.*
   Identify possible risks in the proposed project of which Fiona should take account.

   One point that could be drawn out of a discussion of this exercise is that the choice of objectives will have an effect on risks. Risk is concerned with possible negative outcomes of a project and these will mainly relate to the success or otherwise in achieving the project objectives. Different stakeholders will have different objectives and will therefore identify as risks threats to their particular interests. Thus Fiona and her client could analyse risks in different ways.
   In the case of Fiona's project, the risks might include:
   - Lack of client commitment – as this could be regarded as 'only a student project' it may be difficult to get the client to spare adequate time for such things as the clarification of requirements
   - Conflicts between university and business requirements – the business might want, for example, the project to completed to a timescale that does not fit in with the time when the university expects the project to be done
   - Technical problems – including:
     - Fiona's placement was spent as a support analyst and then as a network manager. She may have had little recent system-building practice and may find that as a consequence that she runs into technical problems
     - The hardware/software environment at the university may be different from that of the business where the application is actually going to be used.
2. *Mo is a systems analyst who is gathering requirements for an application which will record details of the training undertaken by fire-fighters in the client fire brigade. Details of the training units successfully completed by fire-fighters are to be input to the application by trainers who are themselves senior and active fire-fighters. Mo needs to interview a trainer to obtain his/her requirements. Because of the senior fire-fighters' other duties the interview has to be arranged two weeks in advance. There is then a 20% chance of the fire-fighter being unable to attend the interview because of an emergency call-out. Each week that the project is delayed costs the fire brigade approximately £1000.*
   a) Provide an estimate of the risk exposure (as a financial value) for the risk that the senior fire-fighter might not be able to attend at the times needed.
   The cost of an adverse outcome would be £2000 (i.e. two weeks at £1000 a week).
   There is a 20% (0.20) probability of the adverse outcome.

The risk exposure is therefore 20% of £2000, that is £400.

b) Suggest possible risk mitigation actions.

Given the risk exposure of £400, there would be a case of paying someone overtime to cover for the firefighter/trainer who is being interviewed.

Alternatively, appointments could be made with two trainers at different times within the same week. This would not completely eliminate the risk, as it is possible for emergencies to happen at the times of both arranged interviews.

3. *In Exercise 7.2 you were asked to identify risks under the four headings of Actors, Technology, Structure and Tasks for the IOE maintenance group accounts and the Brightmouth College payroll scenarios. Now identify risks for each scenario that relate to pairs of domains, for example, Actors-Technology, Actors-Tasks and so on.*

   - *Actor-Technology* e.g. unfamiliarity with the new technology. This could be caused by the technology being genuinely novel, or by the fact the developers have simply not had the opportunity to use it previously.
   - *Actor- Task* For example, a particular task might be too demanding for the novice developer who happens to be the only one who is available at the required time.
   - *Actor-Structure.* Organizational barriers may make it difficult for people who need to communicate to do so.
   - *Technology-Structure.* An example here might be where software for a control system has to be tested on an expensive hardware configuration, which is used by more than one team. There could be clashes over the use of this valuable resource if an appropriate process was not in place to allocate user in an orderly and rational manner.
   - *Technology-Task*. The example immediately above concerning the shared use of a testing facility could also apply here to the task of testing a software component in the shared technological environment.
   - *Structure-Task.* For example, the management process might dictate that a particular task can only be carried out when approval to start had been provided by higher management

4. *The Wet Holiday Company specializes in the provision of holidays which involve water sports of various types. There are three major divisions with the following lines of business:*
   - *boat holidays on canals*
   - *villa holidays in various parts of the Mediterranean which involve sailing in some way*
   - *canoeing holidays in France*

   Wet Holiday feel that they are particularly appealing to a young active market and that having the facility for customers to book via the web is essential. They call in IT consultants to advise them on their IT strategy. The consultants advise them that before they can have a web presence, they need to have a conventional IT-based booking system to support their telesales operation first. Because of the specialized nature of their business, an off-the-shelf application would not be suitable and that they would need to have a specially written software application, based on a client-server architecture. The top priority needs to be given for a system to support villa holiday

bookings because this has the largest number of customers and generates the most revenue.

Wet Holiday have some in-house IT development staff, but these are inexperienced in client server technology. To meet this short-fall, contractors are employed.

It turns out that development takes much longer than planned. Much of this delay occurs at acceptance testing when the users find many errors and performance shortcomings, which require extensive rework. Part of the problem relates to getting the best performance out of the new architecture, which has a particular impact on response times which are initially unacceptable to staff who are dealing with customers over the phone. The contractors are not closely monitored and some of the code that they produce is found to have many careless mistakes and to be poorly structured and documented. This makes it difficult to make changes to the software after the contractors have left on the expiry of their contracts.

The villa booking system can only be implemented at the beginning of a holiday season and the deadline for the beginning of the 2002 to 2003 season is missed, leading to a 12 month delay in the implementation. The delay in implementation seems to encourage the users to ask for further modifications to the original requirements which adds even more to development costs.

The delays in implementing this application mean that the other scheduled IT development for other lines of business have to be put back. Managers of customer-facing business functions at Wet Holiday are suggesting that the whole IT function should be completely outsourced.

a) Identify the problems that were faced by Wet Holiday, and describe actions that could have been taken to avoid or reduce them..

The main problems can be summarized thus:

- Decision to build a bespoke system when there was a lack of experience of this type of work, leading to staffing problems
- Use of contractors – in response to the first problem – whose work was not closely monitored leading to poor quality software
- The poor quality software meant more time was needed for testing to resolve the problems created
- Delays in implementation led to more time for users to identify changes to requirements.

b) Use your findings in (a) to create a risk checklist for future projects..

Among the things that might appear in a risk checklist are:

1. Is part or all of the proposed application to be written specially? If so could off-the-shelf components be used instead?
2. Do we have staff experienced in the proposed type of work? If not, how will this be dealt e.g. by recruiting new staff who have experience in the area? Training our existing staff?
3. If contractors are to be used carry out part of the work, what controls have been put in place to check that their work is of a satisfactory nature?
4. Is there a rigorous change management system in place which checks that non-essential and time-consuming changes to requirements are not accepted?

5. Below are details of a project. All times are in days

Activity	*Depends on*	*Optimistic time*	*Most likely*	*Pessimistic*
A	*-*	*8*	*10*	*12*

B	*A*	*10*	*15*	*20*
C	*B*	*5*	*7*	*9*
D	*-*	*8*	*10*	*12*
E	*D,C*	*3*	*6*	*9*

Using the activity times above

- *Calculate the expected duration and standard deviation for each activity*
- *Identify the critical path*

					activity duration		start		end	
activity	Depends on	Optimistic time	Most likely	Pessi-mistic	**te**	**s**	expected time	stdev	expected time	stdev
A	-	8	10	12	**10**	**0.67**	0	0.00	10	0.67
B	A	10	15	20	**15**	**1.67**	10	0.67	25	1.80
C	B	5	7	9	**7**	**0.67**	25	1.80	32	1.91
D	-	8	10	12	**10**	**0.67**	0.00	0.00	10	0.67
E	D,C	3	6	9	**6**	**1.00**	32	1.91	38	2.16

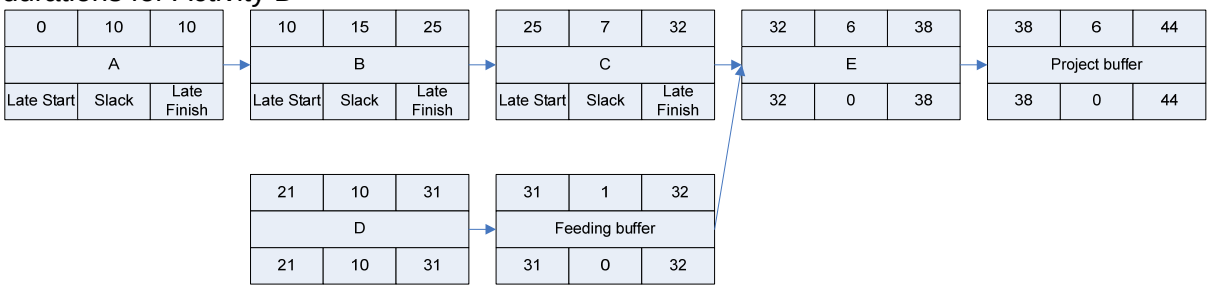
The critical path would be **A,B,C,E.**

- *Draw up an activity diagram applying critical chain principles for this project*
  - *Locate the places where the buffers will need to be located*
  - *Assess the size of the buffers*
  - *Start all activities as late as possible*

Note: project buffer is half the sum of the differences between the pessimistic and most likely durations of the activities on the critical chain: i.e.

((12-10) + (20 -15) + (9-7) + (9-6))/2 = (2+5+2+3)/2 = 6 days

The feeding buffer is half the difference between the pessimistic and the most likely durations for Activity D



6. Below are details of a project. All times are in days

Activity	*Depends on*	*Most likely*	*Plus safety*
A		*10*	*14*
B	*A*	*5*	*7*
C	*B*	*15*	*21*
D	*A*	*3*	*5*
E	*A*	*8*	*12*
F	*E*	*20*	*22*
G	*D*	*6*	*8*
H	*C,F,G*	*10*	*14*

a) *Using (i) the most likely and then (ii) the safety estimates*
   - *Calculate the earliest and latest start and end days and float for each activity;*
   - *Identify the critical path*

ES = Earliest start EF = Earliest finish LS = Latest start LF = Latest finish

The critical path (with all floats zero) is A,E,F,H

Based on most likely durations

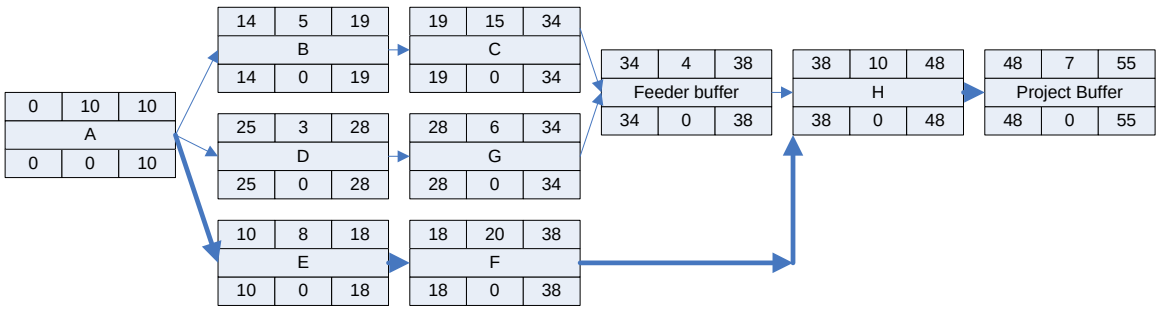
Activity	Depends on	Most likely	ES	Duration	EF	LS	LF	Float
A		10	0	10	10	0	10	0
B	A	5	10	5	15	18	23	8
C	B	15	15	15	30	23	38	8
D	A	3	10	3	13	29	32	19
E	A	8	10	8	18	10	18	0
F	E	20	18	20	38	18	38	0
G	D	6	13	6	19	32	38	19
H	C,F,G	10	38	10	48	38	**48**	0

Based on durations with a safety factor

Activity	Depends on	Plus safety	ES	dur	EF	LS	LF	float
A		14	0	14	14	0	14	0
B	A	7	14	7	21	20	27	6
C	B	21	21	21	42	27	48	6
D	A	5	14	5	19	35	40	21
E	A	12	14	12	26	14	26	0
F	E	22	26	22	48	26	48	0
G	D	8	19	8	27	40	48	21
H	C,F,G	14	48	14	62	48	62	0

b) *Draw up an activity diagram applying critical chain principles for this project*
   - *Locate the places where buffers will need to be located*
   - *Assess the size of the buffers*
   - *Start all activities as late as possible*

Note that there is only one feeder buffer for B+C and D+G, as these are running in parallel. In this case they share a buffer with the size based on whichever feeding buffer would have been bigger. For B+C this would have been 4 days (50% of 2+6 days) as opposed to 2 days for D+G (50% of 2+2 days).



7. *In this chapter the application risk management to software development projects has been strongly advocated. In practice however, managers are often reluctant to apply the techniques. What do think might be the reasons for this?*
   Among the reasons that risk management might not be adopted are:
   - Lack of awareness of the approach
   - Unwillingness to spend additional time and resources on risk management
   - Development managers may want projects to go ahead and do not want project sponsors to be deterred by consideration of possible failure

8. Suppose you are the project manager of a large software development project. List three common types of risks that your project might suffer from. Point out the main steps that you would follow to effectively manage risks in your project.

Three common types of risks that a typical software project might suffer from are:
- Schedule slippage
- Frequent requirements change by the customer
- Team members leaving the organization

The main steps in managing risks are:
- Risk Identification
- Risk Assessment
- Risk Containment

9. Schedule slippage is a very common form of risk that almost every project manager has to deal with. Suppose you are the project manager of a medium-sized project. Explain how you would manage the risk of schedule slippage.

Schedule slippage can be handled by setting regular milestones, producing good quality documents at the completion of the milestone and having rigorous review of the documents.