Exercise (Project Selection - Computation of Effort and Costs) We need to choose between two different project implementations of a software system we will introduce in our firm.

The first option is based on internal development. The proposed project plan has the following characteristics

- Development Process: Waterfall
- Team:
  - 1 project manager (PM) working at 50% of her time for the whole duration of the project (monthly fee: 5000 €);
  - 2 analysts working at full-time for 2 calendar months on analysis and requirements;
  - 4 programmers working at 50% of their time for 6 calendar months on the remaining phases of the waterfall (design, implementation, testing, and deployment);

The second option is based on externalizing the development activities. Our supplier:

- Development Process: SCRUM (8 sprints of 1 month each).
- Team:
  - 4 programmers full-time (monthly fee 4.000 €);
  - one of our employees will have to be available as the "customer". We allocate, for this purpose, a project manager (PM) working at 50% of her time for the whole duration of the project (monthly fee: 5000 €).

What project would you choose and why?

Solution. The exercise requires to perform a project selection. Project selection techniques are described in "Project Initiation: Feasibility and Project Authorization".

We could use the financial techniques we have seen (Payback, ROI, NPV). However, they do not seem to provide much information to select among the different implementations. Both projects are short and the financial exposure is limited in time. Revenues are difficult to compute (we could estimate them in terms of the money saved by introducing the new system); revenues are, in any case, the same in both projects.

The only relevant information are cost and duration. Information about duration, effort, and costs is given in: "Estimating".

For the first option, the development is a waterfall: first analysis and requirements (2 calendar months) and then another 6 calendar months for the remaining activities (design, development, testing and deployment): total duration 2 + 6 = 8 calendar-months.

Duration:

The duration is the sum of the durations of the main activities: 2 calendar-months + 6 calendar-months = 8 calendar months.

Effort:

PM:	8 calendar-months * 50% work/calendar	= 4 man-months
Analysts:	2 people * 2 calendar-months * 100% work/calendar	= 4 man-months
Programmers:	4 people * 6 calendar-months * 50% work/calendar	= 12 man-months

Costs:

PM:	4 man-months * 5000 € / man-month	= 20K €

| Analysts: | 4 man-months * 4000 € / man-month | = 16K € |
| Programmers: | 12 * 3000 € / man-month | = 36K € |

Total cost:

20K € + 16K € + 36K € = **72K €**

For the second option, the development proceeds in sprints of fixed duration. We have 8 sprints of 1 calendar-month each.

Therefore, the duration is 8 months.

Effort:

| Effort (cust.): | 8 calendar-months * 50% work/calendar-unit | = 4 man-months |
| Dev. Team: | 2 people * 8 calendar-months * 100% work/calendar-unit = 16 man-months |

Costs:

| Cost (cust.): | 4 man-months * 5000 € / man-month | = 20K € |
| Dev. Team: | 16 man-months * 4000 € / man-month | = 64K € |

Total Cost:

20K + 64K = **84K**

Thus, if we reason in terms of costs and duration, the internal development option is preferred, since it costs less and it has the same duration.

There are, however, other factors and criteria we might need to consider to make an appropriate choice. For instance, we could also take into account both qualitative and quantitative indicators, such as risks of delays, quality of the final product, costs, the cost/opportunity of diverting the internal team from their activities to the project, duration. In this case the application of a score matrix (in which cost and planned duration could be two factors) could be a better approach.