

An Algorithm for Working With Software of Project Management

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Abstract: The article treats the basic positions of using software for project management. Emphasis is placed on the use of the software product ProjectLibre in project management. The possibility of its application is viewed in the education of students and cadets of the National Military University "Vasil Levski", Veliko Tarnovo.

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JEL Class: A2,B4,C1,C6,C8,I2

1. Introduction

Project management is the science of projects which also includes the application of knowledge, skills, tools and techniques to achieve the objectives for the project requirements.

As such scientific discipline "Project Management" is covered in the curriculum for students and cadets of the National Military University "Vasil Levski", Veliko Tarnovo in "Logistics of security" specialty. The course is taught in the "Business management and logistics" department of "Land forces" faculty.

The challenge for the teaching staff of the department is the implementation of new software technology in theoretical and practical material on project management. New avant-garde software is still not used at the university at this time, unlike in UARD, Plovdiv, for example, where this has been a practice since 2012.

The main challenge for project management is to achieve all the objectives and restrictions of the project. This information is usually described in the owner's or in the project's manual. Secondary and more ambitious challenge is to optimize the allocation of the necessary resources and integrate them to meet predetermined objectives.

The software of project management is a complete software that includes applications for planning, scheduling, monitoring of prices, budget management, resource allocation, teamwork, communication, fast control, documentation and management systems, which are used together in order to manage large projects.

2. Usage of The Software in Project Management

Present day organizations use modern tools to solve tasks to support business management. Unfortunately, the underestimating of such instruments is typical for Bulgaria. Here we can do a lot. There is no need to over analyze, it's sufficient to see the documents of the operational programs and the level of computerization, which applies to them.

However, the world and all leading companies do not stay in this position. In their work, they actively use computer programs to support project management.

Products, oriented to automation of services in project management are: Agresso; Augeo Software; CA Clarity; Epicor Software; IRIS Software Group SharpOWL; Lawson; Maconomy; Microsoft Project Professional; Oracle E-Business Suite; Primavera Systems Evolve; QuickArrow; SAP Professional Services Automation [5], [6], [8], [12], [15], [16], [19].

Other groups of programs are aimed at service products, asset management, management of internal processes: DotProject - OpenSource system for project management; Entexo iProject - System for automation tasks in project management; ProjectMate - Russian PSA-automation system of professional activity; Invest Sign; eGroupWare - a free software project management; OpenProj - a free software project management, alternative to Microsoft Project; GanttProject - small freeware program with Gantt charts and resources; Devprom - lightweight and flexible project management that supports the full

cycle of project development [3] [6] [13] [14] [15] [16].

Examples of software for team work on software projects (software development) are SVN; CVS; TFS (Team Foundation Server); Visual SourceSafe Git [17], [18]. In visualization, authors opted for free software product ProjectLibre, for the reasons stated in [3], [9], [10] advantages over paid MS Project.

ProjectLibre originally launched in August 2012, as the successor of OpenProj [7], [9], [10]. ProjectLibre current features include: task management, decomposition of structure (list and graphical representation), resource allocation and tracking, and diagrams of Gantt, which provide a clear picture of the critical path. Obviously, this list of features is not intended to be comprehensive and is nothing remarkable or unique. More importantly, they are working well and are absolutely suitable to be used in the training of students.

Openproj and ProjectLibre are completely free, open source products, which allows you to save money on Microsoft products while receiving the same functionality without depending on the operating system. In the opinion of many authors [4], [15], [16] these are the best functional open source alternatives to Microsoft Project. Openproj & ProjectLibre are the best alternative because:

- Are very small - Openproj 6.6 MB & ProjectLibre is 10,4MB.
- Are Free.
- Provide opportunities for sharing, visualization, control and monitoring of performance.
- Openproj & ProjectLibre maintain Gantt and Network / PERT charts, as well as visualization tools of invested resources

and their utilization, and project reports from different angles.

- Openproj & ProjectLibre are fully compatible with alternative products and allows easy import and export of documents from MS Project, and also an XML format.

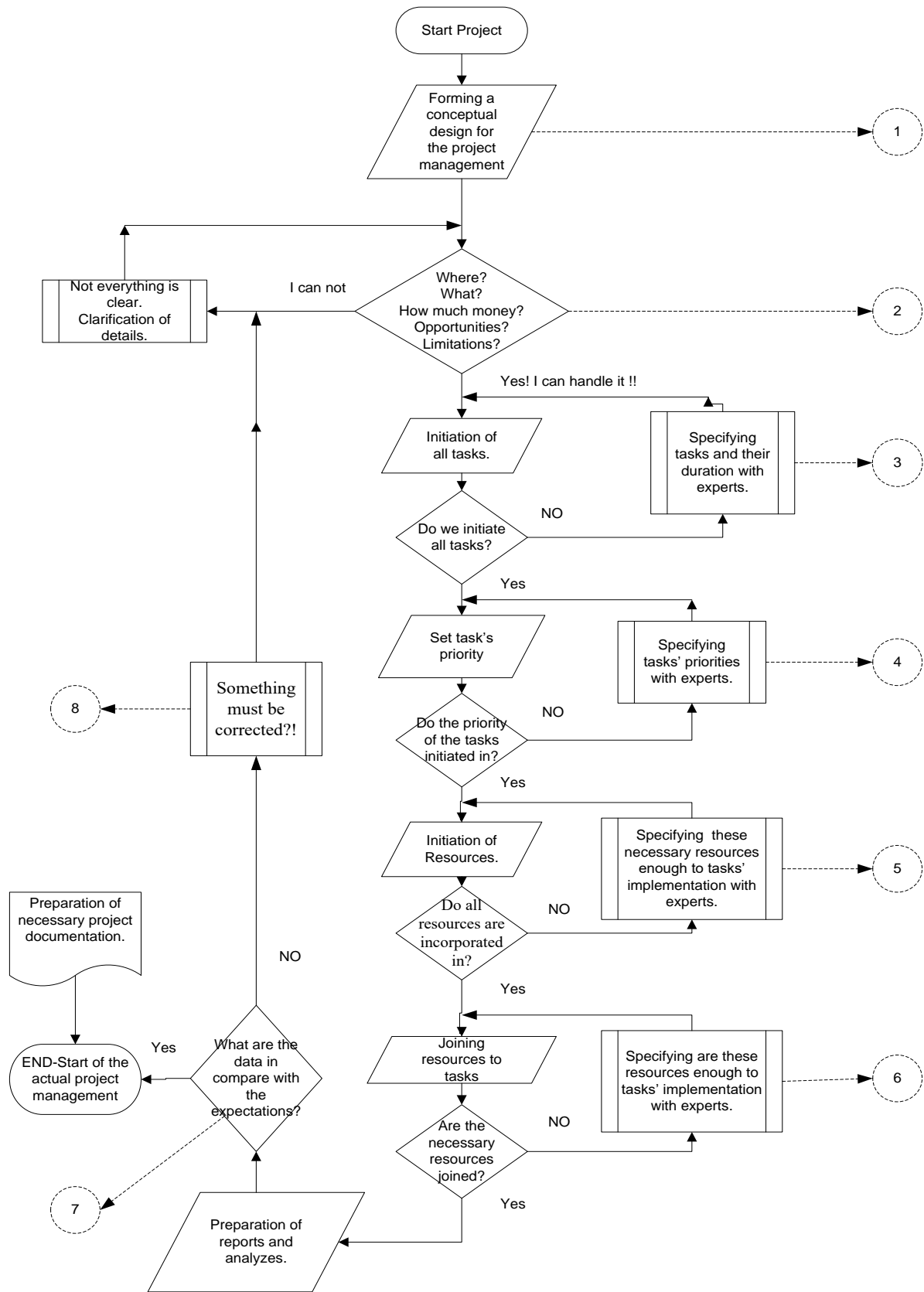
3. Algorithm For Work in The Management of Projects Using Software Tools

The actual process of planning requires not only professionalism, but also the knowledge and experience, and in many cases, creativity and intuition from developers.

GRAPH 1 shows work algorithm in using software product to support the processes of calculation and decision-making team for project management [1], [2], [3], [6], [7].

Below are eight stages to reach the final decision on a project, namely:

- 1) Taking preliminary decision - conceptual intention (we will build a guest house - in general, for example).
- 2) Clarification "For" and "Against" in conceptual design.
- 3) Break down the project tasks and their implementation.
- 4) Set the priority tasks.
- 5) Are we using all the resources?
- 6) Do the necessary resources are incorporated in?
- 7) What are the data in compare with the expectations?
- 8) Something must be corrected?!



Graph 1. Algorithm for work in the management of projects using software tools

3.1. Making a Preliminary Decision

Stage 1 is usually a conceptual design of the owner or the team, working for its preparation, or NGO. It is possible for another entity to act as guarantors for its preparation.

The implementation of each project or initiative begins with Stage 1. It happens, very often, in an informal setting, but the idea is to implement a creative concept in any field of human knowledge and initiative.

The work for the project starts with Stage 1.

3.2. Clarification "For" and "Against" in Conceptual Design

Stage 2 is often accompanied by thorough studies and preliminary analyzes, such as:

- In the municipality;
- In the EU Funds;
- Water Supply and Sewerage Ltd.;
- Energy and heating Ltd.;
- Regional Inspectorate of Environment and Water;
- Other places, connected with the project.

The Stage 2's task is to respond to sometimes very diverse and often controversial issues.

Key questions in Graph 1 are:

- Where will the project be implemented?
- What will its contents be executed with?
- How much money would cost the realization of the project?
- What are subject's opportunities to the implementation of the project?

- Are there any restrictions about the implementation of the project?

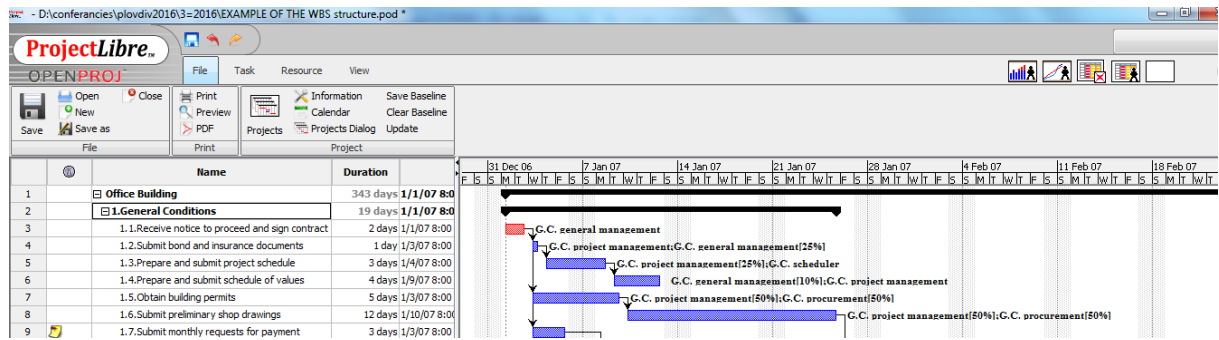
If the answer is "Yes. I can handle it!", we can proceed to the next stage of using the software. If the answer is "No!", we need to lead to define the details and then again to ask the same key questions.

3.3. Stage 3 Is Breaking Down The Project Tasks and Their Implementation

One of the most important stages of planning is a description of a hierarchical structure. For a compact description of the hierarchical structure of the project, we use the so-called code "structure decomposition" (abbreviated in English - WBS, from the Work Breakdown Structure). WBS code is a sequence of numbers or letters (or their combination), divided, if necessary, into groups, each of which corresponds to a particular level of the hierarchy [1], [4], [7]. Each task is assigned with an unique code of the WBS in one project. The using of WBS - codes allows solving three major problems:

- analysis of complex hierarchical structure of the project;
- perform selected works by some formal signs (ie WBS-code);
- unifying a complex project from private projects, which are developed relatively independently, but with the adoption of an uniform coding system.

Once we create and decompose the project, we can proceed to the implementation of tasks and subtasks. GRAPH 2 clearly shows the main tasks - they have an index, and subtasks - they have two indexes. Then, we insert them in a GANTT. The steps' realization is discussed more detailed in [3], [4] and [5].



Graph 2. WBS project structure, tasks and subtasks.

3.4.Set The Priority Tasks

Already established, it is necessary to prioritize tasks and their subtasks. Again, this is done in the table of GANTT.

The steps' realization is discussed more detailed in [3], [4] and [5].

Graph2 clearly shows the extent of their use. The lower the rank of a task is, the more right of the table frame of Gantt it is.

After connecting the tasks with reciprocal links - they are set by WBS hierarchy, the project's Gantt chart is formed.

It should be emphasized that whether you decide to work with MS Project or ProjectLibre, the technology of the algorithm we are proposing here, is identical and gives the same end results.

To complete the steps, it is necessary to introduce the duration of the tasks and subtasks. Length (duration) of the task is the amount of time you expect it will take its implementation. ProjectLibre works lasting from minutes to months.

The duration of a task is directly dependent on two parameters: the set time duration and the calendar of the project / task.

We should not forget the types of activities that are performed by different tasks.

3.5.Are We Using All The Resources?

After entering the tasks, set their hierarchy and their planned duration, we should proceed to the introduction of resources for their implementation. Bring in as many resources, as the experts think are necessary.

ProjectLibre supports the work of two types of resources: labor (work resource), which are the

people (performers) and equipment, material (material resource), which are the materials and energy expenditure.

The setting-up process of adjustment of individual resources isn't a complex procedure and it's a subject to revision throughout the process of project planning and management.

3.6.Do The Necessary Resources Are Incorporated In?

The next major stage is the appointment of the resources to the tasks. By joining and or appointing a resource to the task, we are making it work, it is already in action. Until now these were only either people or money (machinery, fuel, buildings, rents, etc.). Tasks plus resources are appointments.

3.7.What Are The Data (Final Results) in Compare With The Expectations?

It is natural always to seek the end result of work with one product. There are different ways to format the images and better performance of the results. With the diagram of Gantt, as the main tool for analysis, and on the basis of the received reports we can easily determine whether the duration of the project is what we expected it to be, for example, or even if the resulting value is according to our possibilities. It is very important to understand if the computable project, with the software, meets our expectations.

If the answer is "Yes", we should prepare the necessary project documentation and to proceed with the project implementation.

If the answer is "No", we should proceed to Step 8.

3.8. Something Must Be Corrected?!

In practice, this means restructuring the project and perform the steps 2 to 7 again, now with the help of the experts, will be looking for other solutions with other data.

This process of "simulation" of different options with the help of the software, is extremely easy and needed very often in reality. It is even possible this kind of analyses, should be included as a requirement for documentation - to offer several options to solve a case of projects.

The change of WBS project structure and parameters of tasks and subtasks, or the used resources, is possible.

Automating project management has great advantages of ones, which are made by hand.

4. Conclusion

The introduction of the course "Project Management" in National Military University "Vasil Levski", quickened the interest of students to this new and modern science. Planning implementation of software to support the discipline will help to the intensification of training. Planning the whole process with an universal software not only provides mapping out the path, which should move the project, but also is a reliable management tool, during project implementation [3], [8], [16]. The ability to fit unexpected changes in the general plan and recalculation of time and project's needed resources, is one of the most important advantages of organizing the project with specialized software.

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