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## **DEVELOPING OF CLUSTER STATE MONITORING SYSTEM**

The development consisted of five stages: design, development of application logic, development of Unit tests, testing of monitoring system, application integration into a cluster information system.

To implement the project, the object-oriented programming language Java, the Spring framework and the library for unit testing JUnit were chosen. The application is deployed on a Tomcat servlet container.

The application uses programming patterns such as Dependency injection or inversion of control (IOC), Factory Design Pattern, Proxy Design Pattern, and Singleton Design Pattern.

Testing was carried out on a cluster consisting of 3 nodes, 3 shards each. The testing was covered all services, as well as the backup system and system of the introduction nodes and shards with is temporary offline to a working state. In addition to this, Unit tests were developed using the JUnit library, which check the performance of the business logic of the application.

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## **DEVELOPMENT LANDING SHELL AND CONTENT MANAGEMENT FOR MUSEUMS OF THE GSU**

Nowadays, people more often face such a problem as the inability to visit a museum. The causes of this problem are different. The solution to such difficulties is the development of virtual tours of museums and their convenient display for the user, in our case - the museums of GSU.

For the implementation of the objectives of the graduation project, an IDEF0 detailed level diagram was developed, shown in Figure 1, which was used to further develop and optimize the resource. From it you can see what resources and parameters are needed for the successful development of the Landing-shell of the museums of the GSU.

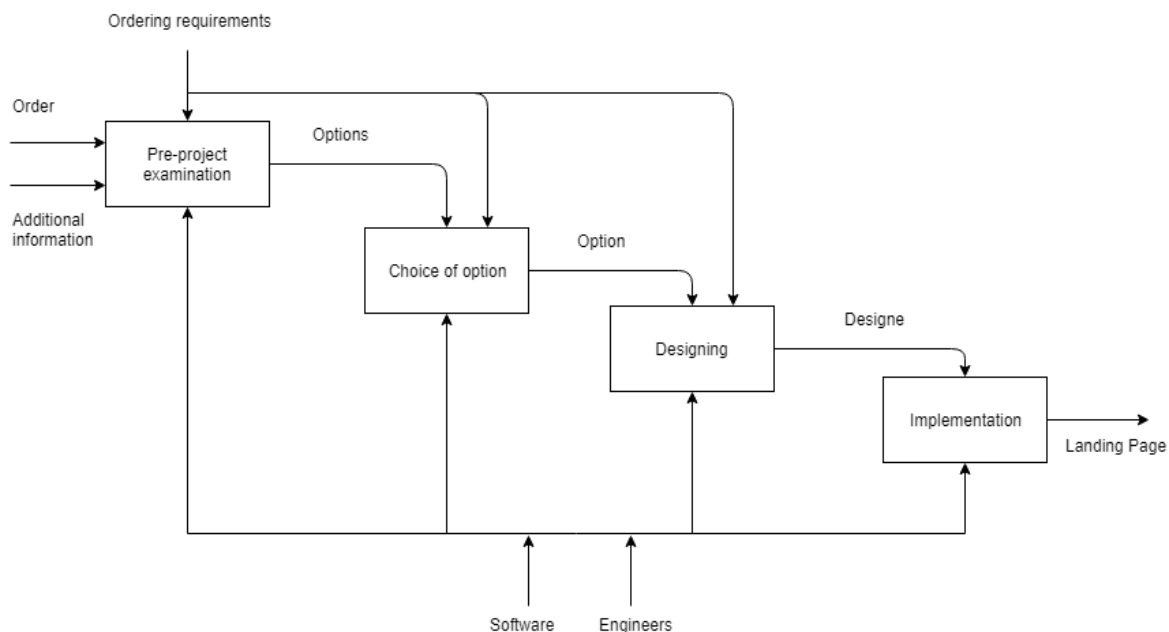


Figure 1 – An example of a developed control panel

Having examined it in more detail, you can see that the input parameters are the order and additional related information from the customer. Next on the control arrow shows the expectations of the project and the necessary implementation. Looking at the input of the mechanism, we see that there are three parameters: software, developers and casting. Software includes products such as Easypano Tourweaver Professional Edition, PTGui, Adobe Photoshop, and others. Next come the developers, i.e., people who work on the development of layouts and solutions, as required. And the last arrow is casting. At this stage, the choice of the options that best meet the requirements of the customer. And on the arrow outputs get the finished product.

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## TESTING OF THE LANDING SHELL FOR MUSEUMS GSU

To create landing shall and content management system, the following software was used: Adobe Photoshop CS6 – a powerful editor of graphics with many years of history, produced by Adobe System; PTGui – a program for creating panoramic images from several photo-graphs; Tourweaver is a program for creating virtual flash tours with a 360-degree panorama, flash animation, video and pictures and transition plans; Visual Studio Code – to create and edit HTML, CSS and JavaScript code.