# Discuss the Phases in the Software Development Life Cycle

A project starts with a request or need for a new program or app, or enhancements to a current one. These requests may arise because new technology is available to improve an existing product, or a need is identified. Once the idea of a project is formed, the development can start. The set of activities used to build a program is called the **software development life cycle (SDLC)** (The set of activities used to build a program.) . Each activity, or phase, is a step in the life cycle. The goal in creating and using an SDLC is to produce the fastest, least expensive, and highest quality product. The steps can vary, and sometimes overlap, but most program development processes include most or all of the following phases: planning, analysis, design, implementation, and support/security (Figure 8-10). To give context to each phase, consider the example of building a virtual reality app for firefighters to simulate fighting a fire in a high-rise building.

Figure 8-10

The SDLC
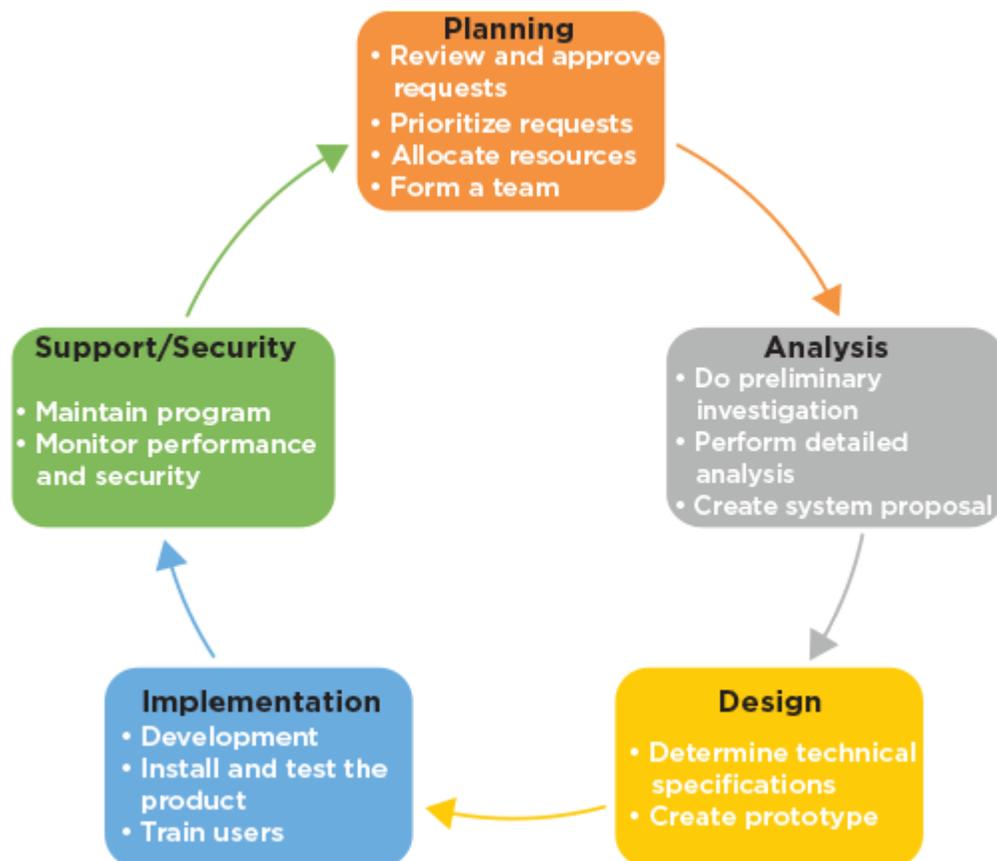
Planning Phase

The **planning phase** (The initial phase of the software development life cycle, including reviewing and approving requests for the project, allocating resources, and forming a project team.) for a project begins with a request for the project. The request might come to a committee that authorizes development, that may consist of business managers, managers, and IT professionals. The committee performs four major activities:

- Review and approve requests.

- Prioritize project requests.

- Allocate resources such as money, people, and equipment.

- Form a project development team.

During this phase, the request comes in from association of fire chiefs in large cities. They have seen a need to safely train newer firefighters with techniques needed to fight fires in larger buildings. They prioritize their needs by asking for one type of building at first—a twelve story older brick building filled with apartments. They have received a grant that will cover the costs of creating this app. You form a development team that includes designers, programmers, and testers, as well as several fire chiefs to review the product during each phase.

Analysis Phase

The **analysis phase** (Phase of the software development life cycle that includes conducting a preliminary investigation and performing detailed analysis.) consists of two major components: conducting a preliminary investigation and performing detailed analysis. The preliminary investigation sometimes is called a feasibility study. The goal of this part of the phase is to determine if the project is worth pursuing. **Feasibility** (The measure of the suitability of the development process to the individual project at any given time.) is the measure of the suitability of the development process to the individual project at any given time. This is a critical phase, as it provides the customer or client with a clear-cut plan for achieving the goals. If a program gets developed without a feasibility study, the work you put into development could be wasted if stakeholders are not happy with the final product. There are four general factors that determine a project's feasibility:

- *Operational feasibility* measures how well the program or app will work, and whether it will meet the requirements of the users.

- *Schedule feasibility* determines if the deadlines for project phases are reasonable. Issues with schedule feasibility might lead to the project's timeline being extended, or the scope of the program or apps features to be scaled back.

- *Technical feasibility* measures whether the developers have the skills and resources, as well as the number of programmers, to complete the features of the program or app.

- *Economic (cost/benefit) feasibility* determines whether the benefits (profits) or a program or app will outweigh the costs of developing and supporting it.

Analysts conduct studies to reach a conclusion about whether or not the project should continue. This study might include interviewing the person(s) who submitted the initial request, reviewing existing documentation, and more. Detailed analysis produces an overview of the users' wants, needs, and requirements and recommends a solution. Once these steps are completed, if the committee or analysts determine the project should go forth, they produce a system proposal. The purpose of a **system proposal** (Using the data gathered during the feasibility study and detailed analysis to present a solution to the need or request.) is to use the data gathered during the feasibility study and detailed analysis to present a solution to the need or request.

During this phase, the team determines the feasibility of the project. The project team has reached an agreement on the scope and requirements with the fire chiefs consulting on the project. The project team's developers have created similar apps before, so they meet the technical feasibility of the project. The timeline is to have a product available for use before the winter, as more fires occur in those months. Because of the grant, the project is economically feasible. The team uses all of these factors to create a system proposal.

Design Phase

The **design phase** (A phase of the software development life cycle when the project team acquires the necessary hardware and programming languages/tools, as well as develops the details of the finished product.) is when the project team acquires the necessary hardware and programming languages/tools, as well as develops the details of the finished product.

During the first part of the design phase, all technical specifications are determined, evaluated, and acquired. The team produces a list of requirements and sends out requests for solutions from potential vendors. Vendors submit back to the team proposals that include all estimated costs, as well as timeline for completion. The team then makes decisions about how to best meet the technical needs of the project, and accepts the proposals from vendors that meet those requirements.

The second phase outlines the specifications for each component in the finished project. This includes all input and output methods, as well as the actions a user can perform. During this phase, the analyst or developer will create charts and designs that show a mockup of the sample product. Other decisions that get made during this part of the phase include media, formats, data validation, and other factors developers use to create a prototype of the final product. A **prototype** (A working model that demonstrates the functionality of the program or app.) is a working model that demonstrates the functionality of the program or app.

During this phase, the team working on the fire safety app chooses a designer from a short list of vendors who can meet the schedule and budget. The developer presents a chart of all

of the options and navigation methods of the training, as well as the technical specifications to complete the tasks. The team considers UX when coming up with a prototype that includes the format, media, and sample data.

Implementation Phase

The purpose of the **implementation phase** (Phase of the software development life cycle in which the new program or app is built and delivered to users.) is to build the new program or app and deliver it to users. During this phase, the development team performs three major activities:

- Develop the program or app using programming tools or languages.

- Install and test the product, including each individual component and how it works with other programs and apps.

- Train users to use the new product, including one-on-one or group sessions, web-based tutorials, and user manuals.

In the case of a program or app that will be used on a network or system, such as a database, the final step in the implementation phase is to convert to the new system. Conversion can happen all at once, in phases, or as a pilot program in one location or department.

During this phase, the developers create the first versions of the finished app by using programming tools. They install and test the product on the fire chiefs' devices, and incorporate their feedback. Then they test the app with a wider audience, and train firefighters to use the app. The team also creates a user manual that is accessible from the app.

Support and Security Phase

During the **support and security phase** (Phase of the software development life cycle that involves providing necessary maintenance for a program or app, such as fixing errors or improving functionality; also includes monitoring performance to ensure efficiency.) the program or app receives necessary maintenance, such as fixing errors or improving its functionality. Analysts also monitor the performance to ensure the efficiency of the program or app.

One of the most important parts of any program or app's development is ensuring its security. All elements of the program or app must be secure from hacking, or from unauthorized collection of data of its users. Security concerns are addressed through each phase of development, and apps are tested for reliability.

One of the ways developers ensure that their products work as intended is to test them thoroughly. During the **testing** (A process in which each app or program function is tested to ensure it works properly.) process, each function is tested to ensure it works properly.

Testing starts at the first phases of development and continues throughout. **Quality assurance** (Testing software and reporting any issues to the developers.) testers perform the testing and report any issues to the developers.

Testers and developers include documentation in the code. **Documentation** (A collection and summary of the data, information, and deliverables specific to a project.) is a collection and summary of the data, information, and deliverables specific to the project. Documentation involves adding notes to the code that explain and outline the intended function of sections or lines of code. During development, project members produce documentation. It is important that all documentation be well written, thorough, consistent, and understandable. Project managers distribute documentation guidelines to all project members to ensure that the documentation each produces will be complete and consistent. Documentation reflects the development process in detail. Developers should produce documentation during development, not after, in order to ensure its accuracy and thoroughness. Documentation also can be used as the basis for user manuals and instructions that help you learn how to use all features of the program or app. Reputable developers include both testing and documentation for all of their products.

During this phase, the team continues to add different scenarios to the app, increasing the knowledge that can be gained by using it. Each new scenario is thoroughly tested before its release. The team also addresses any security issues that arise.