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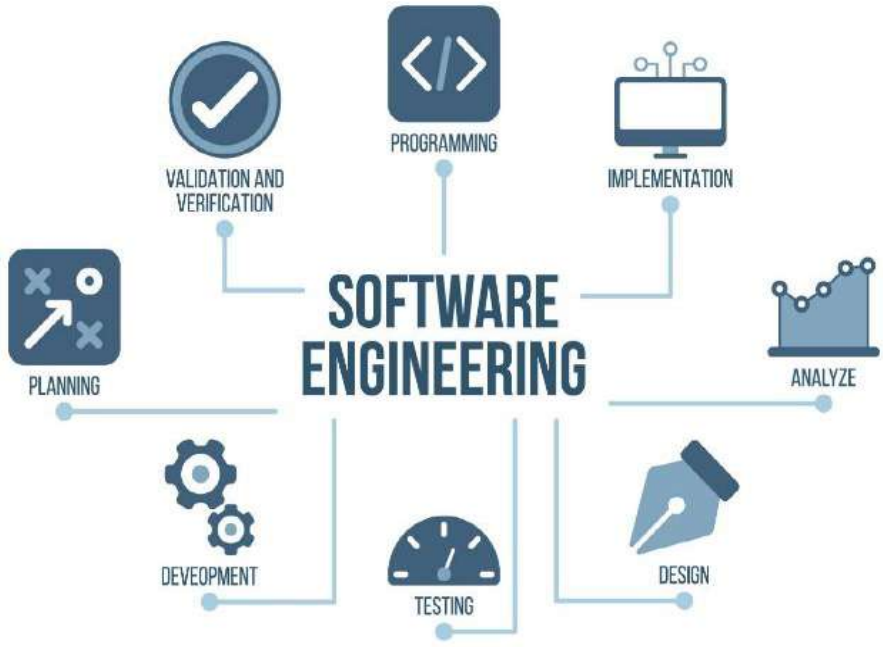
TECH-ON-TOP

E-JOURNAL ON SOFTWARE ENGINEERING TECHNOLOGIES



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AUTOMATED TESTING TOOLS IN AGILE

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Automation testing means using an automation tool to execute you test case suite. The automation software can also enter test data into system under test, compare expected and actual results and generate detailed test reports. Test automation demands considerable investments of money and resources.

Agile development is evolved through self-organized teams. It is a type of incremental model and these small incremental releases are built on previous functionality. One of the most important advantages of agile testing is that accepts last minute changes.

Testers in agile projects uses different testing tools to test various functionalities within the applications. There are many testing processes done in agile for different reasons they are as follows:

- Functional testing – on operations which perform as per the expectations.
- Regression testing – on the behavior of the system which has not been changed.
- Exception or Negative testing – thereby forcing error condition in the system.
- Stress testing – to determine the absolute capacities of the applications and operational infrastructure.

The benefits of doing all these testing are reliable, repeatable, programmable, comprehensive, reusable, better quality software, fast, economical.

To be success in all these above testing we need testing tools. There are few testing tools famous in software industry they are:

- Work soft.
- PractiTest
- Juno one
- JIRA
- Tea trail
- Soap UI.

Work soft:

Work soft certify provides an agile testing framework that enables non-technical users, developers and test automation professionals to work together in an agile fashion and easily integrate into Dev Ops tools, chains, and processes.

It enables agile adoption by building automation closer to development sprint when documentation is top of mind. Quickly identify and document existing business processes and variations. Achieve end-to-end business process testing across enterprise applications.

PractiTest:

PractiTest is also a test management tool for agile. it is easy to learn, affordable & flexible and helps both developers and testers. It includes requirements, test runs, results, issues, reporting and provides the detailed status of the project. It manages development and testing processes and has control of each and every task.

Comparing both Work soft and practiTest, practiTest helps the developer in many ways to figure is mistake out easily has it includes all the phases of project.

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AGILE TESTING

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Agile testing is a continuous process aligns with iterative development methodology with customer requirements. The main aim of agile testing is to achieve high product quality. Agile testing is unstructured when compared to waterfall model where there is minimal planning. Every iteration has its own testing phase, suitable for smaller projects. User acceptance is performed at every sprints.

PRINCIPLES OF AGILE TESTING: testing is continuous, continuous feedback, tests performed by the whole team, decrease time of feedback response, simplified & clean code, less documentation, test driven.

AGILE TESTING METHODS:

- **Behavior Driven Development (BDD):** it improves communication amongst project stakeholders. It holds information on how a given feature should behave in different situations with different input parameters. These are called "executable specifications" as it comprises of both specification and inputs to the automated tests.
- **Acceptance Test Driven Development (ATDD):** it mainly focuses on involving team members with different perspectives. The acceptance tests are a representation of the user's point of view and it describes how the system will function. In some instances acceptance tests are automated.
- **Exploratory testing:** the test design and test execution goes phase by phase. Customer collaboration holds greater value than contract negotiation.it is more adoptable to changes. Testers identify functionality of an application by exploring the application and execute test plans according to their findings.

TEST PLAN FOR AGILE:

- The scope of testing
- Consolidating new functionalities to be tested
- Types of testing
- Performance and load testing
- Consideration of infrastructure
- Risks plan
- Planning of resources
- Deliverables and milestones

AGILE TESTING LIFECYCLE:

- Impact assessment, Agile testing planning, Lease readiness, Daily scrums, Test agility review

CONCLUSION: Agile testing reduces the cost of bugs and yields high quality products.

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REVERSE ENGINEERING

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Reverse engineering is a process of recovering the design, requirement specification and functions of a product from an analysis of its code. It builds a program database and generates information from this.

The purpose of reverse engineering is to facilitate the maintenance work by improving the understandability of a system and to produce the necessary documents for a legacy system.

Reverse Engineering Goals:

- Cope with complexity.
- Recover lost information.
- Detect side effects.
- Synthesis higher abstraction.
- Facilitate reuse.

Steps for Reverse Engineering:

1. Collection information: This step focuses on collecting all possible information (i.e. source design documents etc.) about the software.

2. Examining the information: The information collected in step-1 as studied so as to get familiar with the system.

3. Extracting the structure: This step concerns with identification of program structure in the form of structure chart where each node corresponds to some routine.

4. Recording the functionality: During this step processing details of each module of the structure, charts are recorded using structured language like decision table etc.

5. Recording data flow: From the information extracted in step3 and step4, set of dataflow diagrams are derived to show the flow of data among the processes.

6. Recording control flow: High level control structure of the software is recorded.

7. Review extracted design: Design document extracted is reviewed several times to ensure consistency and correctness.

8. Genrate documentation: Finally, in this step, the complete documentation including SRS, design document, history, overview, etc… are recorded for future use.

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DIFFERENT KINDS OF TESTING ERRORS IN SOFTWARE ENGINEERING

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SOFTWARE ERRORS:

An Error is a Deviation from Accuracy or Correctness. "A Software Bug is an Error, Flaw failure, or Fault in a Computer Program or System that causes it to produce an incorrect or unexpected result or to behave in unintended ways".

TYPES OF ERRORS:

1) Functionality Errors: Functionality is a way the Software is intended to behave. Software has a Functionality Error if something that you expect it to do is hard, awkward, confusing, or impossible.

2) Communication Errors: These Errors Occur in Communication from software to end user. Anything that the end user needs to know in order to user the software should be made available on screen.

3) Missing commands Errors: This happens to occur when an expected command is missing. So, tester have to check which command is missing.

4) Syntactic Errors: Syntactic errors are misspelled words or grammatically incorrect sentences and are very evident while testing software GUI.

5) Error Handling Errors: Any Errors that occur while the user is interacting the software needs to be handle in a clear and meaning manner. If not, it is called as an Error Handling Error.

6) Calculation Errors: These errors occur due to any the following reasons:

Bad logic
Incorrect formulae
Data type mismatch
Coding errors.
Function call issues, etc.

7) Control flow Errors: The control flow of a software describes what it will do next and on what condition.

Conclusion:

- Defect identification, categorization, reporting and eventually removal are all part of quality control activities. The very crux of software quality assurance is to establish monitoring an inspecting processes at each stage of the software development life cycle.
- The aim is to detect errors as early possible. This is because the costs to find and fix errors increase dramatically as software development progresses. Hence identifying errors early on is essential.
- Therefore, it is essential that we are able to identify, seek and report any errors that we come across during testing phase.

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CRYSTAL AGILE METHODOLOGY

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Alistair Cockburn was asked to develop the methodology for object-oriented projects in 1991 by IBM. He used his findings to construct a family of methodologies and then he named it Crystal. Crystal method is an approach that focuses on people and their interactions while working on a project rather than on processes and tools.

Assumptions of Crystal Method:

- Teams can become a more optimized team by streamlining their processes as their work.
- Projects require specific methods as they are unique and dynamic.

Members of Crystal Method:

It is seen that the project properties change depending on the number of the people involved in the project and also the level of criticality of the project. Smaller team can handle and build the product without a lot of reporting and paperwork. The more people on the team, the more critical the project is and the more complex the approach is. There is no single Crystal method there are different Crystal methodologies for different types of projects. The approach most suitable for your project depends on three dimensions: Team size, Criticality and what the priority of the project is.

Generally, they are characterized by colors, according to the number of people involved in the project:

Clear - for teams of 8 or fewer people.
Yellow - for teams of 10-20 people.
Orange - for teams of 20-50 people.
Red - for teams of 50-100 people.

CHARACTERISTICS:

Human-powered: It means that people involved in the project are vital and the processes should be adapted to meet people's needs.

Adaptive: It means that processes and tools are not fixed, but it has to be adjusted to meet the requirements of the team and the project.

Ultra-light: They don't involve too much of documentation. It keeps things light by focusing on transparent workflow between the team and the client by practicing open communication between team members.

Properties:

Frequent delivery - it allows you to frequently deliver working, tested code to real users.

Reflective improvement - no matter how bad or good the product is, there are ways how the product can be improved.

Osmotic communication - with the team working co-located, information flows around the team.

Personal Safety-Team members should be able to speak without fear, no matter whether they are presenting a new idea or talking about a potential problem.
Focus - each team member knows exactly what to work on that enables them to focus their attention and avoid switching from one task to another.
Easy access to expert users - This enables the team to maintain communication and get regular feedback from real users.

ADVANTAGES:

- Continuous integration.
- Flexible and configurable processes.
- Active user involvement.

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KANBAN

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INTRODUCTION:

Kanban is a popular framework in the agile methodologies which is used for the development of the software. It became an effective tool to support running a production system as a whole, and an excellent way to promote an improvement. It is a concept based on the lean and just in time production, where it is used as a scheduling system. Because of its flexibility it allows overlaid on existing workflows, systems and process. This Kanban framework is being used in the Toyota motor corporation.

KANBAN CARDS:

Kanban cards are the one where it signals a message of the depletion of product, parts or inventory. As the signals received the Kanban triggers the replenishment of the product. Then the consumption, therefore drives demand for more production and so that Kanban cards signals demand for the more product. In various software systems, Kanban cards signaling demands suppliers through the email notification.

PRINCIPLES:

This Kanban has the four core principles like:

1. Visualize the work.
2. Limit the work in progress.
3. Focus on the flow.
4. Continuous improvement

IMPLEMENTATION:

Kanban is being implemented in Toyota to organize manufacturing and logistics for the automobile manufacturer, including interaction with the suppliers and customers. The basic concept is to reduce the cost through elimination of waste and to make full use of the worker's capabilities. Toyota has formulated six rules, and close monitoring of these rules is never ending task, where the Kanban does task what is required.

Six rules:

1. When each process is done it request the suppliers for the need for the product.
2. Each process will occur based on the quantity and sequence of incoming request.
3. No items will be made or transport until the request is made.
4. The request associated with an item is always attached to it.
5. After the processes make sure that it is a defect-free.
6. Limit the pending request make sure that the process is more sensitive and quick.

BENEFITS:

1. Increased productivity.
2. Preventing team burden.
3. Increased team focus.
4. Reduced waste.
5. Flexibility.
6. Improved collaboration.
7. More predictability.
8. Better visibility.

CONCLUSION:

This concludes that the Kanban is one of the most popular and famous framework among the agile methods. And this is being implemented by Toyota motor corporation because of its flexibility and rapidness of the work. This is very useful in terms of waste reduction and effective utilization of resources. As compared to other framework this Kanban is also far more directly responsive to the customer directly. This also tells visually when production should start and stop.

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COMPARISON BETWEEN CRYSTAL METHODS AND DYNAMIC SYSTEM DEVELOPMENT METHODS

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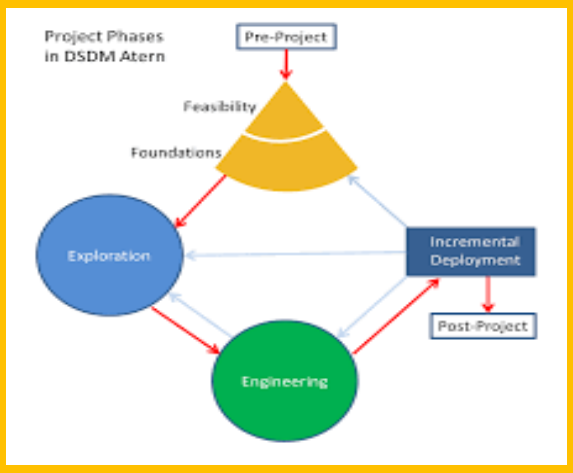
Dynamic Systems Development Method (DSDM)

Dynamic Systems Development Method (DSDM) was published in 1995 by the DSDM Consortium, an association formed by vendors and experts in software engineering to provide a structure for Rapid Application Development techniques brought on by object oriented programming. It has now evolved into a project delivery framework that is fully compatible with ISO 9000 and PRINCE2. In 2007, it was rebranded Aten after the bird Arctic Tern. However, since 2014, it has reverted back to its original name as DSDM Agile Project Framework. Also, in 2016, the DSDM Consortium rebranded as the Agile Business Consortium



DSDM consists of eight principles that will direct the team and create a mindset to deliver on time and within budget. Principles include focusing on the business need, delivering on time by time boxing work, and emphasizing collaboration with end users, team members, business representatives and other stakeholders. As a framework and not just a software development method, it can also be used in non-IT projects.

Crystal Methods

Crystal Methods are a family of software development methodologies developed by Alistair Cockburn from his study and interviews of teams. The methods are color-coded to signify the risk to human life. Crystal focuses on six primary aspects: people, interaction, community, communication, skills, and talents. Process is considered secondary. There are also seven common properties in Crystal that indicate higher possibility of success and they include frequent delivery, reflective improvement, osmotic communication, and easy access to expert users. The methods are very flexible and avoid rigid processes because of its human-powered or people-centric focus. Crystal Methods consider people as the most important, so processes should be modeled to meet the requirements of the team. It is adaptive, without a set of prescribed tools and techniques. It is also lightweight, without too much documentation, management or reporting. The weight of the methodology is determined by the project environment and team size. For example, Crystal Clear is for short-term projects by a team of 6 developers working out of a single workspace.

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AGILE PROJECT DEVELOPMENT USING SCRUM BAN

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NAMITHA RAMESH

Introduction:

Scrum ban is the combination of Scrum and Kanban. It will use the features of both software development models. It is a methodology which makes scrum leaner and flow oriented. In Scrumban, at regular interval we can do iteration planning.

Principles:

1. Visualize the Framework: It is one of the important tool taken from Kanban and it is applied to scrum ban.

2. Limit Work in progress (WIP): Based on team's capacity, it limits the work at every stage.

Scrum ban Framework Development:

Now-a-days scum bam is very popular in service industries because they have both development and maintenance projects. Scrum ban is considered for maintenance of projects, Event driven work, Support, System testing, packaging and deployment.

Project Development using Scrum ban:

1. Goals: It may be broad objective which is accomplished by doing multiple smaller task by the team.
2. Story Queue: Here, goals are broken into multiple stories. At this stage, a long list of stories are created.
3. Analysis: Few stories are selected form the previous stage and are used for further work.
4. Development: It starts working on selected stories.
5. Testing: Testing is done on the stories by QA team, once the work has been completed.
6. Deployment: The results are put into practice.
7. Done: All completed stories will be marked as done.

Advantages of Scrum Ban Framework

1. Stakeholder Engagement: Multiple opportunities are provided to stakeholders and team engagement before, during and after each sprint.
2. Allows for change: There is an opportunity to make changes or to to refine and reprioritize the overall product backlog.
3. Early and predictable delivery: New features are delivered quickly and easily, with high level of predictability.
4. Improves Quality: The project team can focus on high quality development when we break the project into manageable units.

Conclusion:

By adding WIP and visualization to scrum ban, it helps to improve sprint commitment effectiveness, WIP improves the overall system and helps to many projects pitfalls in terms of cost, predictability in controlled manner.

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AZURE RP

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Introduction:

Azure RP is an approach to software development which is suitable for creating data type diagrams and documentation. It creates interactive prototypes and diagrams for particular applications. It is used to create designs for a prototype which does not require any coding. It is very user friendly. It involves drag and drop options, content writing and animation for designing.

Features-

- **Documentation:**
  - Each prototype consists of diagrams, flowcharts and documentation in order to specify the important components of the project.
  - It is used to store information about the project and crack the tasks in the project.
  - It is used to organize nodes according to the actors of the project.
  - This makes the prototype interactive.
- **Setting project to the team:**
  - Any user can create projects with respected stake holders and team members.
  - Azure RP provides a facility to send prototypes, diagrams and respected documentations through a directory called Team directory.
  - It also allows user to give a feedback if any changes must be made to the prototypes.
  - It is also used to publish an Azure RP projects.
  - The iOS and android devices can be accessed and it is plat for independent.

Commercialization of Azure includes-

The latest version of azure RP is "azure RP 9".
There are 3 versions of azure RP.

1. Pro- It includes the basic/primary functionalities such as documentation and publishing.
2. Team- it adds co-authoring for team projects, revision history and team projects hosting on azure share, 8
3. Enterprise-this version includes all of the above plus Azure share on premises allowing licences to publish their own servers and various other functionalities.

Over 17,411 companies are using azureRP. To name a few, American airlines, synergies.

More about Azure-

Azure was developed by Azure Software solutions. The operating systems it can be used in are- Microsoft Windows XP, Microsoft Windows 7, Microsoft Windows 8, Microsoft Windows 10, Mac OS X. Companies like VACASA, Brainshark, CarMax, Merchants Automotive and COLAB in the United States use Azure in top level industries like hospitality, retail, finance and business services.

Since azure provides an environment for interactive HTML prototyping for web and custom applications, it is more effective and user friendly over other approaches. It can easily generate

HTML and JavaScript prototypes without writing a single line of code. Version control is also an added on feature of azure.
When compared to other popular prototyping tools like Mock plus, Proto.io and Justin mind, azure is cost effective, provides a wider range of widgets ad design, and provides gesture reaction for user interactivity. Azure users can easily test prototypes on their phones but the actual animations and interactive effects cannot be restored which has a drawback in presentation and usability testing. Overall, azure is an effective prototyping tool but not in all ways. Azure's rich features is to achieve complex interactions that are suitable for professional designers to achieve high-fidelity prototype.

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BLOCK CHAIN-BASED SOFTWARE ENGINEERING

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Introduction: Block chain-based technology allows us to build a robust, distributed system including a pay mechanism the execution of predefined behavior a working consensus protocol, and a tamper-proof history of every transaction. The actors in such a system can be anonymous, pseudo anonymous, or known. We argue that these characteristics are of high significance for certain SE problems. Core among them stand the Block chain's promises to decentralized trust and verifiability.

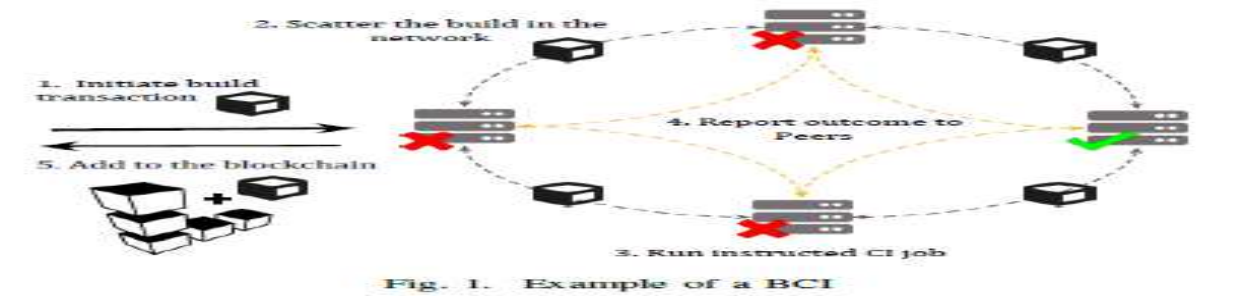

Fig. 1. Example of a BCI

Block chain-based continuous integration: The execution of build tasks could serve as a viable proof-of-work by hashing and signing the build log output and replace the wasteful proof-of-work concept Bitcoin currently employs. Moreover, the highly parallel nature of CI with its many build and test execution environments lends itself toward expediting via a large set of worker nodes. A BCI opens a market for computing power in which everyone can partake and earn money with otherwise idling resources. This in turn also means that the economic rules of demand and supply regulate build prices, not a single company. A Block chain based CI would allow developers to specify a high transaction cost on this one build. All nodes would prioritize the execution of this build job, since they earn a high margin. Developers would be more flexible, but only always pay what they need in the moment. A Block chain of CI builds would self-serve as a distributed archive. Practical challenge of implementing a BCI remain.1) How to store build logs 2) How to resolve non-deterministic builds

A Block chain-based package repository. BAPT encapsulates a verifiable community-driven regression test framework for package repositories. Similar to BCI, every participant in BAPT can pick a new release candidate from the "mem pool", verifies that the release works as intended and does not break compatibility with downstream clients. Important questions on how to implement

BAPT remain:

1) How do we find consensus on what is a "good release?"
2) How do we test packages?

The larger implications that BBSE could bring with it to the software engineering landscape.

1) Professionalization. 2). Improved 3). Quality Trust.

Conclusion: Block chain-based SE (BBSE) can enable to solve elementary problems in SE also we have sketched designs for 1) a distributed, democratized build service, called BCI, _2) a user-run package management system, called BAPT.

Reference: www.google.com

OUTSOURCE SOFTWARE DEVELOPMENT

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Introduction: Outsource software development describes a situation in which an organization chooses to hire a third-party programmer to offer services related to software development. According to current statistics, at least 60% of the total outsourcing market is comprised of software workers.

Advantages:

1. Minimal operating expenses: The most obvious benefit of outsourcing development is cost reduction. For a business, minimizing expenses is one of the surest ways of enhancing growth.

2. Flexibility: Outsourcing development is ideal in situations where your business hits a low season or when you are running specific projects on a limited budget.

3. Time-saving: Outsourcing offers lots of potentials particularly when working within a tight deadline. It will deliver your project on time and as their first priority is customer's satisfaction.

4. Easy approach to innovative technologies: Outsourcing the project gives an easy approach to an innovative technology that external service provider uses. Additionally, outsourcing company also gives customers a training about understating of codes and programming.

5. Risk management: Outsourcing your project also frees you from risk management outsourcing comes with true procedures for developing application. So, outsourcing gets rid of taking a risk and trial method to run the application.

Disadvantages:

1. Low Quality of Service: There is the possibility of experiencing a low performance from the developer when they are charging far lower than existing market prices.

2. Miscommunication: When hiring a company from abroad, there is a difference in language, culture, and time, and this can create challenges for both parties.

3. Skills Availability: It is very crucial to check whether better skilled workers are available or not. They show fake numbers of skilled workers working for them which leads to bad quality of work and results.

4. Staff Turnover: The requirement for staff in these outsourced companies are very much, this reduces the quality of the.

5. Hidden costs: Although outsourcing most of the times is cost-effective at times the hidden costs involved. There is always a risk of getting a huge bill compiled of hidden fees even decided the outsource expenses.

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COMPARISON BETWEEN XP AND JAD MODEL

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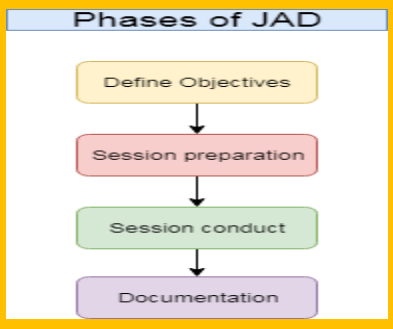
EXTREME PROGRAMMING (XP)

XP is one of the Agile Software Development Methodologies. It involves writing unit tests before programming and keeping all of these tests running at all times. The unit tests are automated and eliminates defects, it will be reducing the costs.
A way to handle the common shortcomings. Software Engineering involves
1. Creativity
2. Learning and Improving through trials and errors.
3. Iterations
XP builds on these activities and coding. It starts with a simple design that is enough to code the features at hand and redesigning when it is required. XP will Integrate and testing the whole system several times in a day. By putting a minimal working system into the production, that will quickly and upgrading it whenever it is required. Keeping the customer involved all the time and obtaining constant feedback

JOINT APPLICATION DEVELOPMENT (JAD)

Joint Application Development (JAD) is a development methodology system originally used for designing a computer-based system, but can be applied to any development process. It involves continuous interaction with the users and different designers of the system in development. JAD centers on a workshop session that is structured and focused. Participants of these sessions would typically include a facilitator, end users, developers, observers, mediators and experts. JAD allows for a faster development process and minimizes errors at the same time. JAD also improves the quality of the final product by focusing on the up-front portion of the development lifecycle, thus reducing the likelihood of errors that are expensive to correct later on.



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PROJECT MANAGEMANT AND COST ESTIMATION

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Introduction:

Cost estimation in project management is the process of forecasting the financial and other resources needed to complete a project within a defined scope. Cost estimation accounts for each element required for the project-from materials to labor and calculates a total amount that determines a projects budget.

They are two key types of cost addressed by the cost estimation process:

- Direct cost: These are the costs associate with a single area, such as a department or this particular projects itself.
- Indirect cost: These are the cost incurred by the organization at large, such as a utilities and quality control.

Different types of estimates:

There are five types of estimates based on accuracy:

- Order of Magnitude. Also called Rough Order of Magnitude (ROM) or Rough cost estimate, or conceptual Estimate, this types of estimate is used for project screening, or deciding which among several projects to proceeds with…
- Feasibility…
- Prelinary…
- Substantive…
- Definitive…

Cost estimation important in project management:

Cost estimating. Being able to make accurate cost estimates is key to delivering a solid project plan. Cost estimating utilize many techniques that translate the project scope into deliverable and develop an approximation of cost resource needed to complete projects activities**.**

Advantages:

Cost benefits analysis is a simple technique for comparing the business value a project will produce with the cost of producing it. Project managers use cost-benefit analysis in the project initiation phase to show the value of doing a projects.

Disadvantages:

Another disadvantages seen when utilizing a cost benefit analysis is the possibility that the evaluative mechanism turns in to a proposed budget…This can put a project manager in an

unfavorable situation when he or she attempts to control costs in order to maintain the expected profit margins.

Conclusion:

Project cost management involves estimating, budgeting, and controlling costs with the ultimate goal of delivering completed project on-time and with budget. For a Project to be successful, it's important to accurately predict costs estimates.

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