Version Control Systems

Question:
Explain the difference between Git and SVN

Version Control Systems

GIT	SVN
Own copy of entire codebase	Central codebase on a shared server
Git records commits	Changes made to the central codebase
Branching	Everyone has to connect to central server
Merge	Communication among others to avoid conflict
Manual resolution of conflicts	SVN relies on central authority

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GIT	SVN
Complexity	Centralized workflow
Command Line Interface(CLI)	Limitation to offline work
Repository Size	Branching and Merging complexity
Lack of centralized control	Slower operations

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Question:
What are the advantages of using branching in Git?

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1. Independent Development

- Multiple developers can work simultaneously on different features or bug fixes
- Each developer can create their own branch and make changes independently
- Promotes collaboration and productivity within a team

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2. Isolated Environment

- Each branch represents an isolated environment for experimentation and testing
- Changes made in a branch don't affect the main codebase until they are merged
- Ensures stability and functionality of the main branch and other branches

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3. Feature Segregation

- Create separate branches for different features or enhancements
- Organizes and manages code changes related to specific features
- Enables focused development, easier change tracking, and better code modularity

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4. Easy Bug Fixing

- Create dedicated branches for addressing specific bugs or issues
- Develop and test bug fixes independently without affecting ongoing development
- Merge the bug fix branch back into the main branch once resolved

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5. Versioning and Rollbacks

- Create branches to represent different versions or releases of the project
- Switch between branches to access specific versions of the code
- Easily roll back changes by reverting to a previous branch

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6. Code Review and Collaboration

- Submit branches for code review before merging into the main branch
- Receive feedback, suggestions, and ensure code quality
- Enhances collaboration and maintains code quality

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7. Continuous Integration

- Branches seamlessly integrate with continuous integration (CI) workflows
- CI systems can build, test, and validate code changes in branches
- Ensures proper validation before merging into the main branch

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8. Experimentation and Prototyping

- Use branches for experimenting, trying out new ideas, and prototyping
- Test different approaches and prototype new features
- Allows for innovation and exploration while keeping the main branch stable

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Question:
What is a git commit and why is it important?

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- Snapshot of the codebase
- Track history of the project

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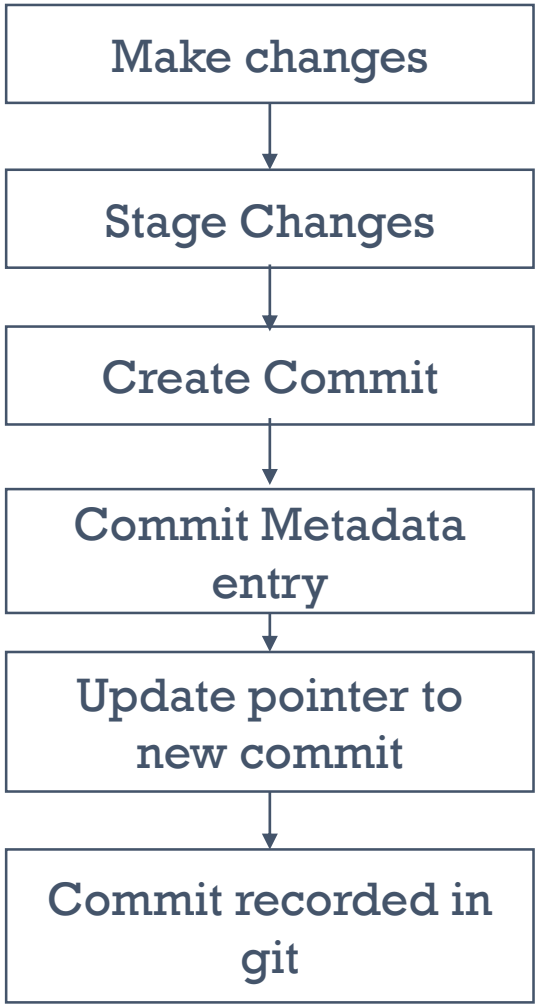

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```
commit 53a7c5a2e13e4c750cc6f58f7ae1e15d7fd45678
Author: John Doe <johndoe@example.com>
Date:   Mon May 10 14:30:22 2023 -0700

    Added new feature X
```

- Hash/Commit ID
- Commit message
- Author information
- Timestamp

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- Version History
- Code Revision
- Collaboration

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Question:
How does git handle conflicts during a merge operation?

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```
<<<<<<< HEAD
This is the original content of the file.
=======
This is the conflicting content added by another developer.
>>>>>>> branch-name
```

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- Detecting Conflicts
- Marking conflicted files
- Stopping the merge process
- Manual conflict resolution
- Resolving conflicts
- Completing the merge

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Question:
What is the purpose of git tags?

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- Clear version identification
- Easy access to historical versions
- Stable release management
- Version comparison and tracking
- Documentation and communication
- Maintenance and bug fixes
- Release automation