In order to create a hierarchical tree structure for a security case for Instant Messaging (IM) software from the given security case pattern, we need to follow the steps outlined in the context provided. This involves removing placeholders, pattern-specific decorators, and replacing generic placeholders with concrete information specific to Instant Messaging (IM) software.

First, let's replace the placeholders in each of the goals and contexts with concrete information about IM software:

1. Goal (G1, "IM software is acceptably secure")

2. Context (C1, "Definition and description of IM software")

3. Context (C2, "Definition and description of the system where IM software is deployed")

4. Context (C3, "Definition of acceptably secure")

5. Context (C4, "List of IM software critical assets")

The critical assets as provided in the domain-specific information are:

- Registration information

- Registration process

- User account information

- Authentication information

- Login process

- Chat logs

We then expand this out in the hierarchical tree:

- Goal (G1, "IM software is acceptably secure")

- Context (C1, "Definition and description of IM software")

- Context (C2, "Definition and description of the system where IM software is deployed")

- Context (C3, "Definition of acceptably secure")

- Strategy (S1, "Argument that IM software assets are under protection")

- Justification (J1, "Protection of software assets supports that the software is acceptably secure")

- Goal (G2, "All identified IM software critical assets are protected")

- Strategy (S2, "Respective arguments for IM software critical assets")

- Context (C4, "List of IM software critical assets")

- Justification (J2, "Relationship between assets is clear and can be argued separately")

- Goal (G3, "Registration information is protected")

- Strategy (S3, "Argument of the type which the software critical asset belongs to")

- Context (C5, "List of software critical asset types in PEDD")

- Justification (J3, "Types of software assets are according to PEDD")

- Goal (G4, "Registration information which belongs to Process is protected")

- Goal (G3, "Registration process is protected")

- Strategy (S3, "Argument of the type which the software critical asset belongs to")

- Context (C5, "List of software critical asset types in PEDD")

- Justification (J3, "Types of software assets are according to PEDD")

- Goal (G4, "Registration process which belongs to Process is protected")

- Goal (G3, "User account information is protected")

- Strategy (S3, "Argument of the type which the software critical asset belongs to")

- Context (C5, "List of software critical asset types in PEDD")

- Justification (J3, "Types of software assets are according to PEDD")

- Goal (G4, "User account information which belongs to Data Storage is protected")

- Goal (G3, "Authentication information is protected")

- Strategy (S3, "Argument of the type which the software critical asset belongs to")

- Context (C5, "List of software critical asset types in PEDD")

- Justification (J3, "Types of software assets are according to PEDD")

- Goal (G4, "Authentication information which belongs to Data Storage is protected")

- Goal (G3, "Login process is protected")

- Strategy (S3, "Argument of the type which the software critical asset belongs to")

- Context (C5, "List of software critical asset types in PEDD")

- Justification (J3, "Types of software assets are according to PEDD")

- Goal (G4, "Login process which belongs to Process is protected")

- Goal (G3, "Chat logs are protected")

- Strategy (S3, "Argument of the type which the software critical asset belongs to")

- Context (C5, "List of software critical asset types in PEDD")

- Justification (J3, "Types of software assets are according to PEDD")

- Goal (G4, "Chat logs which belongs to Data Storage is protected")

In summary, the final hierarchical tree structure for the IM software security case is as follows:

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- G1: IM software is acceptably secure

- C1: Definition and description of IM software

- C2: Definition and description of the system where IM software is deployed

- C3: Definition of acceptably secure

- S1: Argument that IM software assets are under protection

- J1: Protection of software assets supports that the software is acceptably secure

- G2: All identified IM software critical assets are protected

- S2: Respective arguments for IM software critical assets

- C4: List of IM software critical assets

- J2: Relationship between assets is clear and can be argued separately

- G3: Registration information is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

- G4: Registration information which belongs to Process is protected

- G3: Registration process is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

- G4: Registration process which belongs to Process is protected

- G3: User account information is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

- G4: User account information which belongs to Data Storage is protected

- G3: Authentication information is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

- G4: Authentication information which belongs to Data Storage is protected

- G3: Login process is protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

- G4: Login process which belongs to Process is protected

- G3: Chat logs are protected

- S3: Argument of the type which the software critical asset belongs to

- C5: List of software critical asset types in PEDD

- J3: Types of software assets are according to PEDD

- G4: Chat logs which belongs to Data Storage is protected

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