Assignment-2 Volleyball DL

Group no.: G1

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Domain Specifications:

The domain we need to capture is on volleyball tournaments. Thus the ontology needs to capture statistical information about any given tournament. Thus the concepts like a tournament, team, player, match and so on need to be present. Furthermore roles relating these concepts together and to actual data values need to be specified as well.

A clear definition of concepts and roles used in the DL is as below:

Concepts:

Volleyball	Represents a volleyball tournament
Tournament	Represents a tournament that takes place during a volleyball tournament
Team	Represents a volleyball team
Player	Represents a player who belongs to a team
Referee	Represents a referee who officiates a match
Match	Represents a match that takes place between two teams during a tournament
Set	Represents a set that takes place within a match

Roles:

hasTournament	Relates a team to the tournament it belongs to
hasCoach	Relates a team to its coach
hasPlayer	Relates a team to its players
hasName	Relates a team or tournament to its name
hasLocation	Relates a tournament to its location
hasDate	Relates a tournament to its date
hasVenue	Relates a tournament to its venue
hasOrganizer	Relates a tournament to its organizer
hasSponsor	Relates a tournament to its sponsor
hasReferee	Relates a match to its referee
hasTeam1	Relates a match to its first team
hasTeam2	Relates a match to its second team
hasSets	Relates a match to its sets
hasTeam1Score	Relates a set to the score of the first team
hasTeam2Score	Relates a set to the score of the second team
matchID	Relates match with an Unique match identifier
setNum	Relates the set with the set number

teamID	Relates team with an Unique team identifier
Jersey	Relates player with a Jersey number of a player
Height	Relates player with a Height of a player
Weight	Relates player with a Weight of a player
birthdate	Relates player with a Date of birth of a player
hometown	Relates player with a Place of origin of a player
year	Relates player with a Number of years in the team as a player
hasExperience	Relates referee with the number of years of experience of a referee
hasCourt	Relates match with the court number/name of where a specific match will be played.
setID	Relates set with an Unique identifier of a set
setDuration	Relates set with a Time duration of a set
captain	Relatates a team and a player as a special relationship
color	Relates a team with a color (RGB values)
serve_order	Relates a team with a sequence of players
timeout	Relates a team with time left to them to pause a match

TBox for the ontology:

Axioms:

- Volleyball ⊑ ∃ hasTournament.Tournament

- Tournament ⊑ ∃ hasName.String ⊓ ∃ hasLocation.String ⊓ ∃ hasDate.String ⊓

  ∃ hasVenue.String ⊓ ∃ hasOrganizer.String ⊔ ∃ hasSponsor.String

- Team ⊑ ∃ hasName.String ⊓ ∃ hasPlayer.Player ⊓ ∃ hasCoach.Coach ⊓

  ∃ teamID.Integer

- Player ⊑ ∃ hasName.String ⊓ ∃ hasPosition.String

- Referee ⊑ ∃ hasName.String ⊓ ∃ hasType.String

- Match ⊑ ∃ hasTeam1.Team ⊓ ∃ hasTeam2.Team ⊓ ∃ hasSets.Set ⊓

  ∃ hasReferee.Referee ⊓ ∃ matchID.Integer

- Set ⊑ ∃ hasTeam1Score.Integer ⊓ ∃ hasTeam2Score.Integer ⊓

  ∃ setNum.Integer

These axioms define the relationships between the concepts and roles in the model, and they ensure that the model is consistent with the constraints of the DTD.

Classes:

- Volleyball

- Tournament

- Team

- Coach

- Referee

- Sponsor

- Organizer

- Player

- Match

- Point

- Set

- Team_1

- Team_2

- Team_1 Score

- Team_2 Score

- Line Judge

Properties:

- hasName (Player, Team)

- hasNumber (Player)

- hasPosition (Player)

- belongsToTeam (Player, Team)

- hasPlayer (Team, Player)

- hasOpponent (Match, Team)

- hasHomeTeam (Match, Team)

- hasAwayTeam (Match, Team)

- hasSet (Match, Set)

- hasGame (Set, Game)

- hasPoint (Game, Point)

- hasScorer (Point, Player)

- hasReceiver (Point, Player)

DL Axioms:

- Player ⊑ ¬Team

- Team ⊑ ¬Player

- Match ⊑ ∃hasHomeTeam.Team ⊓ ∃hasAwayTeam.Team ⊓ (∀hasSet.Set)

- Set ⊑ (∀hasGame.Game)

- Game ⊑ (∀hasPoint.Point)

- Point ⊑ ∃hasScorer.Player ⊓ ∃hasReceiver.Player

- (∃belongsToTeam.Team) ⊑ (∀hasPlayer.Player)

- (∃hasPlayer.Player) ⊑ (∃belongsToTeam.Team)

- (∃hasHomeTeam.Team) ⊑ (∃hasAwayTeam.Team)

- (∃hasAwayTeam.Team) ⊑ (∃hasHomeTeam.Team)

ABox for the ontology:

Here is an example ABox for the ontology:

Individuals:

tournament1 (type: Tournament)

team1 (type: Team)

team2 (type: Team)

player1 (type: Player)

player2 (type: Player)

player3 (type: Player)

player4 (type: Player)

player5 (type: Player)

player6 (type: Player)

referee1 (type: Referee)

referee2 (type: Referee)

match1 (type: Match)

set1 (type: Set)

set2 (type: Set)

Object Property assertions:

hasVenue(tournament1, venue1)

hasTeam(tournament1, team1)

hasTeam(tournament1, team2)

hasPlayer(team1, player1)

hasPlayer(team1, player2)

hasPlayer(team2, player3)

hasPlayer(team2, player4)

hasReferee(tournament1, referee1)

hasReferee(tournament1, referee2)

hasMatch(tournament1, match1)

hasSet(match1, set1)

hasSet(match1, set2)

hasTeam1(set1, team1)

hasTeam2(set1, team2)

hasTeam1(set2, team2)

hasTeam2(set2, team1)

Data Property assertions:

hasTeamID(team1, "001")

hasTeamID(team2, "002")

hasName(tournament1, "National Volleyball Tournament 2023")

hasLocation(tournament1, "Los Angeles, CA")

hasDate(tournament1, "2023-07-15")

hasName(team1, "LA Team")

hasName(team2, "NY Team")

hasName(player1, "John Smith")

hasPosition(player1, "Middle Blocker")

hasJersey(player1, "12")

hasHeight(player1, "6'4"")

hasWeight(player1, "185 lbs")

hasBirthdate(player1, "1995-05-23")

hasHometown(player1, "Los Angeles, CA")

hasYear(player1, "Senior")

hasName(player2, "Emily Wilson")

hasPosition(player2, "Setter")

hasJersey(player2, "8")

hasHeight(player2, "5'10"")

hasWeight(player2, "140 lbs")

hasBirthdate(player2, "1998-02-12")

hasHometown(player2, "Chicago, IL")

hasYear(player2, "Sophomore")

hasName(player3, "Mike Johnson")

hasPosition(player3, "Outside Hitter")

hasJersey(player3, "15")

hasHeight(player3, "6'2"")

hasWeight(player3, "180 lbs")

hasBirthdate(player3, "1996-08-17")

hasHometown(player3, "New York, NY")

hasYear(player3, "Senior")

hasName(player4, "Sarah Lee")

hasPosition(player4, "Libero")

hasJersey(player4, "5")

hasHeight(player4, "5'7"")

hasWeight(player4, "135 lbs")

hasBirthdate(player4, "1999-03-04")

hasHometown(player4, "Boston, MA")

hasYear(player4, "Freshman")

Situations/examples:

Here are some situations/examples for the above XML data:

- Keishin Ukai is the coach of Karasuno High.
- Shoyo Hinata, who plays as Middle Blocker for Karasuno High, is from Miyagi Prefecture, Japan.
- Toru Oikawa is the captain of the Aoba Johsai High who plays as Setter.
- Wakatoshi Ushijima plays the Ace for Shiratorizawa Academy.
- Satori Tendo is listed as Shiratorizawa's Middle Blocker, suggesting he plays a role in both blocking and attacking.
- Karasuno High scored 26-28 against Aoba Johsai High in the second set.
- Karasuno High won the third set by scoring 26-24 against Aoba Johsai High and also took 2 timeouts.
- Kanaka Shinzo acted as referee in the match between Karasuno High and Shiratorizawa Academy, along with line judges Yamato Shoyo and Kaneki Kunimi.
- The tournament named "International Volleyball Championship" is scheduled to take place on June 10, 2023, in Los Angeles, California.
- The International Volleyball Championship tournament is organized by the International Volleyball Association and sponsored by Adidas and Nike.