

# Assignment 2

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September 2022

## 1 Charecterstic Rules

(i)

$$\begin{aligned} & \forall(x)propertytype \Rightarrow \\ & (((propertybuildingstatus(x) \in Active) \wedge (cityname(x) \in city)) \vee \\ & ((propertybuildingstatus(x) \in InActive) \wedge (cityname(x) \in city)) \vee \\ & ((propertybuildingstatus(x) \in Unverified) \wedge (cityname(x) \in city)) \vee \\ & ((propertybuildingstatus(x) \in Active) \wedge (cityname(x) \in metropolitoncity)) \vee \\ & ((propertybuildingstatus(x) \in InActive) \wedge (cityname(x) \in metropolitoncity)) \vee \\ & ((propertybuildingstatus(x) \in Unverified) \wedge (cityname(x) \in metropolitoncity))) \end{aligned}$$

(ii)

$$\begin{aligned} & \forall(x)propertystatus \Rightarrow \\ & (((propertytype(x) \in Apartment, Residentialplot \wedge (propertybuildingstatus(x) \in \\ & InActive) \wedge (cityname(x) \in city)) \vee \\ & ((propertytype(x) \in Apartment, Independentfloor, villa \wedge (propertybuildingstatus(x) \in \\ & InActive) \wedge (cityname(x) \in metropolitoncity)) \vee \\ & ((propertytype(x) \in Apartment, IndependentHouse \wedge (propertybuildingstatus(x) \in \\ & Unverified) \wedge (cityname(x) \in city)) \vee \\ & ((propertytype(x) \in Apartment \wedge (propertybuildingstatus(x) \in InActive) \wedge \\ & (cityname(x) \in metropolitoncity)) \vee \\ & ((propertytype(x) \in Apartment, IndependentHouse, Independentfloor, villa, Residentialplot \wedge \\ & (propertybuildingstatus(x) \in InActive) \wedge (cityname(x) \in city, metropolitoncity))) \end{aligned}$$

(iii)

$$\begin{aligned} & \forall(x)cityname \Rightarrow \\ & ((propertytype(x) \in \{Apartment, Residentialplot, Independenthouse, IndependentFloor, villa\} \wedge \\ & (propertybuildingstatus(x) \in Active) \wedge (propertystatus(x) \in \{undercounstruction, readytomove\})) \vee \\ & ((propertytype(x) \in Apartment \wedge (propertybuildingstatus(x) \in InActive) \wedge \\ & (propertystatus(x) \in undercounstruction)) \vee \end{aligned}$$

$((property\_type(x) \in \{Apartment, Residentialplot, IndependentFloor, villa\} \wedge (propertybuildingstatus(x) \in InActive) \wedge (propertystatus(x) \in Readytomove))) \vee$

$((property\_type(x) \in \{Apartment, IndependentHouse\} \wedge (propertybuildingstatus(x) \in Unverified) \wedge (propertystatus(x) \in underconstruction))) \vee$   
 $((property\_type(x) \in Apartment \wedge (propertybuildingstatus(x) \in Unverified) \wedge (propertystatus(x) \in readytomove)))$

## 2 Classification Rules

### 2.1 propertyStatus

(i)

$\forall(x) propertystatus \in underconstruction \Rightarrow$   
 $((property\_type(x) \in IndependentHouse) \wedge (propertybuildingstatus(x) \in Unverified) \wedge (priceperunitarea(x) \in Luxury) \wedge (cityname(x) \in city)) \vee$   
 $((property\_type(x) \in Apartment) \wedge (propertybuildingstatus(x) \in Inactive) \wedge (priceperunitarea(x) \in Luxury) \wedge (cityname(x) \in metropolitoncity)) \vee$   
 $((property\_type(x) \in Apartment) \wedge (propertybuildingstatus(x) \in Active) \wedge (priceperunitarea(x) \in Luxury) \wedge (cityname(x) \in metropolitoncity)) \vee$   
 $((property\_type(x) \in ResidentialPlot) \wedge (propertybuildingstatus(x) \in Active) \wedge (priceperunitarea(x) \in Budget) \wedge (cityname(x) \in city)) \vee$   
 $((property\_type(x) \in Apartment) \wedge (propertybuildingstatus(x) \in Active) \wedge (priceperunitarea(x) \in ultraLuxury) \wedge (cityname(x) \in metropolitoncity))$

(ii)

$\forall(x) propertystatus \in readytomove \Rightarrow$   
 $((property\_type(x) \in \{IndependentFloor, villa\}) \wedge (propertybuildingstatus(x) \in Active) \wedge (priceperunitarea(x) \in Ultraluxury) \wedge (cityname(x) \in \{city, metropolitoncity\})) \vee$   
 $((property\_type(x) \in \{IndependentFloor, Apartment, villa\}) \wedge (propertybuildingstatus(x) \in InActive) \wedge (priceperunitarea(x) \in Budget) \wedge (cityname(x) \in metropolitoncity)) \vee$   
 $((property\_type(x) \in \{Residentialplot, Apartment\}) \wedge (propertybuildingstatus(x) \in InActive) \wedge (priceperunitarea(x) \in \{Budget, luxury\}) \wedge (cityname(x) \in city)) \vee$   
 $((property\_type(x) \in \{Residentialplot, Apartment, IndependentFloor, Independenthouse\}) \wedge (propertybuildingstatus(x) \in Active) \wedge (priceperunitarea(x) \in \{Budget, luxury\}) \wedge (cityname(x) \in city, metropolitoncity))$

## 2.2 Citytypes

(i)

$$\begin{aligned} &\forall(x)citytype \in othercity \Rightarrow \\ &((property\_type(x) \in \{IndependentFloor\}) \wedge (property\_buildingstatus(x) \in InActive) \wedge \\ &(priceperunitarea(x) \in \{Budget\}) \wedge (propertystatus(x) \in readytomove)) \vee \\ &((property\_type(x) \in \{Residentialplot\}) \wedge (property\_buildingstatus(x) \in Active) \wedge \\ &(priceperunitarea(x) \in \{Luxury\}) \wedge (propertystatus(x) \in readytomove)) \vee \\ &((property\_type(x) \in \{IndependentFloor, villa, apartment\}) \wedge (property\_buildingstatus(x) \in \\ &InActive) \wedge (priceperunitarea(x) \in \{Budget, ultraluxury\}) \wedge (propertystatus(x) \in \\ &readytomove)) \end{aligned}$$

(ii)

$$\begin{aligned} &\forall(x)citytype \in techonologycity \Rightarrow \\ &((property\_type(x) \in \{IndependentFloor\}) \wedge (property\_buildingstatus(x) \in Active) \wedge \\ &(priceperunitarea(x) \in \{ultraluxury\}) \wedge (propertystatus(x) \in readytomove)) \vee \\ &((property\_type(x) \in \{apartment\}) \wedge (property\_buildingstatus(x) \in Active) \wedge \\ &(priceperunitarea(x) \in \{ultraluxury\}) \wedge (propertystatus(x) \in underconstruction)) \vee \\ &((property\_type(x) \in \{Residentialplot, independenthouse\}) \wedge (property\_buildingstatus(x) \in \\ &unverified) \wedge (priceperunitarea(x) \in \{luxury\}) \wedge (propertystatus(x) \in underconstruction)) \vee \\ &((property\_type(x) \in \{apartment\}) \wedge (property\_buildingstatus(x) \in unverified) \wedge \\ &(priceperunitarea(x) \in \{luxury\}) \wedge (propertystatus(x) \in readytomove)) \vee \\ &((property\_type(x) \in \{apartment, independentfloor, independenthouse, residentialplot\}) \wedge \\ &(property\_buildingstatus(x) \in Active) \wedge (priceperunitarea(x) \in \{luxury, budget\}) \wedge \\ &(propertystatus(x) \in readytomove)) \vee \\ &((property\_type(x) \in \{apartment, independentfloor, independenthouse, residentialplot, villa\}) \wedge \\ &(property\_buildingstatus(x) \in Active) \wedge (priceperunitarea(x) \in \{luxury, budget\}) \wedge \\ &(propertystatus(x) \in readytomove)) \end{aligned}$$

## 2.3 priceranges

(i)

$$\begin{aligned} &\forall(x)pricerange \in budget \Rightarrow ((property\_type(x) \in \{IndependentFloor, villa, apartment\}) \wedge \\ &(property\_buildingstatus(x) \in Inactive) \wedge (cityname(x) \in \{city, metropolitoncity\}) \wedge \\ &(propertystatus(x) \in readytomove)) \vee \\ &((property\_type(x) \in \{apartment\}) \wedge (property\_buildingstatus(x) \in Unverified) \wedge \\ &(cityname(x) \in \{city, metropolitoncity\}) \wedge (propertystatus(x) \in \{underconstruction, readytomove\})) \vee \\ &((property\_type(x) \in \{apartment, IndependentFloor, villa, Independenthouse, residentialplot\}) \wedge \\ &(property\_buildingstatus(x) \in Unverified) \wedge (cityname(x) \in \{city, metropolitoncity\}) \wedge \\ &(propertystatus(x) \in \{underconstruction, readytomove\})) \end{aligned}$$

(ii)

$\forall(x) \text{pricerange} \in \text{luxury} \Rightarrow ((\text{property\_type}(x) \in \{\text{IndependentHouse}\}) \wedge$   
 $(\text{property\_building\_status}(x) \in \text{Unverified}) \wedge (\text{city\_name}(x) \in \{\text{city}\}) \wedge (\text{property\_status}(x) \in$   
 $\text{underconstruction}))$

### 3 summarization

(a)

$\forall(x) \text{property\_building\_status} \in \text{active} \wedge \text{city\_name} \in \{\text{bangalore, chennai, hyderabad, mumbai}\} \Rightarrow$   
 $((\text{property\_type}(x) \in \{\text{apartment}\}) \wedge (\text{property\_status}(x) \in \text{underconstruction})) \vee$   
 $((\text{property\_type}(x) \in \{\text{apartment, residentialplot}\}) \wedge (\text{property\_status}(x) \in \text{readytomove}))$

(b)

$\forall(x) \text{property\_status} \in \text{underconstruction} \wedge \text{city\_name} \in \{\text{ahmedabad, delhi, kolkata, lucknow}\}$   
 $\text{price\_per\_unit\_area} \in \text{luxury} \Rightarrow$   
 $((\text{property\_type}(x) \in \{\text{apartment}\}) \wedge (\text{property\_building\_status}(x) \in \text{active}) \wedge$   
 $(\text{size} \in \text{large}) \wedge (\text{price} \in \{\text{ultra\_luxury}\})) \vee$   
 $((\text{property\_type}(x) \in \{\text{apartment}\}) \wedge (\text{property\_building\_status}(x) \in \text{active}) \wedge$   
 $(\text{size} \in \text{small}) \wedge (\text{price} \in \{\text{luxury}\})) \vee$   
 $((\text{property\_type}(x) \in \{\text{apartment}\}) \wedge (\text{property\_building\_status}(x) \in \text{active}) \wedge$   
 $(\text{size} \in \text{medium}) \wedge (\text{price} \in \{\text{luxury, ultra\_luxury}\}))$