

STUDY OF ROW HOUSES AND FLATS ENVIRONMENTALLY RESPONSIVE AND LOCAL WISDOM

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Abstract

Banten Provincial Government is planning the construction of flats and row houses in several locations in Banten Province. However, the flats and row houses that will be realized are currently being developed as prototypes for each of these dwellings. So that the flats and row houses that will be built according to the needs of the residents in them. Therefore, it is necessary to design simple rental flats or row houses that can support the community's needs regarding social and living comfort. Research objectives of the study of Prototype Development of Horizontal and Vertical Residential Types are needed to meet the needs of decent and affordable housing and meet the comfort requirements. Security and health within the scope of potential regional heterogeneity, particularly the potential for building materials, culture, and physical characteristics of the area. This study will serve as the basis for studying the Development of Prototype Types of Horizontal and Vertical Residential Houses. The research method used is to adopt the Target Oriented Planning approach, which is a planning thought that is more emphasized solely on the goals & objectives that will be achieved. As for the planning of this prototype, the target referred to here is the design prototype of a simple rental apartment that meets the building function criteria for occupant activities, architectural performance criteria, and responsiveness to prospective residents' social, economic considerations case low-income people. From research to determine the best alternative in handling slum settlements through the development of Prototype Types of Horizontal and Vertical Residential Houses following environmental conditions in each Regency / City in Banten Province.

Keywords: flat, row house, prototype, horizontal, vertical, residential.

Introduction

Banten Provincial Government is planning the construction of flats and row houses in several locations in Banten Province. However, the flats and row houses that will be realized are currently being developed as prototypes for each of these dwellings. So that the flats and row houses that will be built according to the needs of the residents in them. Therefore, it is necessary to design a simple rental apartment or row house that can support the community's needs in terms of social and living comfort.

The design with a prototype approach is carried out by considering the number of similar buildings built quite a lot (Murray et al., 2019). The building design model, in this case, the flats, for example, with a prototype approach, is aimed at accelerating the procurement of houses, done by:

Making a drawing of the original form / basic design of the flats, which includes; (1) Architectural drawings include building mass, ground floor plan, floor plan 1, typical floor plan 2-etc., views, sections, details; (2) Structural drawings include substructure/foundation, superstructure, details; (3) Mechanical and electrical drawings include; (a) Electric network; (b) Clean Water Channels; (c) Sewer; (d) Lightning rod; (e) Telephone; (f) Tv Networks, Special Installations, Fire Extinguishers; (g) Garbage disposal, etc.

An Explanation of the Work Plan and Conditions

All of the design drawings above are original/essential form documents; then, you can use the prototype design for other Flats designs, namely using the document by reusing / repetitively. The prototype design is carried out using the original/basic drawings that can be used again / repeatedly for Flats in other locations/places. This approach adopts a Transforming Tradition method developed to maintain the tradition applied in the context of design (Leykam et al., 2018). The method used in the Transforming Tradition theory as a controlling parameter to see the transformation form of the Transforming Tradition theory is the ATUMICS method which stands for Artefact - Technique - Utility - Material- Icon- Concept - Shape.

This theoretical approach is carried out to study artifacts, namely the Bandung City Hall Office, to see how the local architectural concept, in this case, Banten province, is applied (Jung et al., 2015). Origin of band gaps in graphene on hexagonal boron nitride. Nature communications, 6(1), 1-11. It examines how local content elements are transformed to suit their time. The first process in transforming building artifacts is to determine a "pre-code," a control tool (Shao et al., 2018). How to transform can be done with the following steps; (1) A visual statement with a conceptual approach to problems using three-dimensional images; (3) Perform transformation evaluation, both in terms of function/use, form, and image.

Analysis means categorizing, structuring, manipulating, and summarizing data to obtain answers to research questions. Therefore, the analysis method can be called a method used to process and test data against research questions using specific procedures (Pereira et al., 2020).

Research conducted by Callens & Zadpoor (2018) Based on data quoted from the Bandung City Statistics Agency (2015), the total population in Bandung is 2,470,802 residents with a population growth rate of 9.2%. This means that the population in Bandung every year increases by around 227,313 people. This phenomenon causes Bandung to experience a population density issue due to the high population growth rate while the available land is getting smaller. This raises other problems related to the provision of shelter or housing, especially for low-income people (Yu et al., 2018). The hospital as a referral health facility that provides health services to the community has a very strategic role in accelerating the improvement of the public health status in the border areas of the country (Andiyan & Heriyanto, 2021). One area that experiences population density issues is Tamansari Village, Bandung Wetan District, Bandung City. Tamansari Village is listed as the village with the highest population in Bandung Wetan District, with 23,972 people or around 77.82% of the total population in Bandung Wetan District. Congregations performing ablution from their respective homes are still being applied to this day (Cardiah et al., 2021).

Regarding overcrowding in this sub-district, the Bandung City Government made a program to build a series of houses with the theme of flats in 11 neighborhoods and 12 residents of the Tamansari Village (Li et al., 2019). Rumah Susun is a vertical housing typology that resembles an apartment but is designed to strengthen the theme and context of the locality in which the apartment is built. Flats are planned and designed by applying an inclusive theme (Abdel-Karim et al., 2018). The purpose of applying this theme to housing is to make the Tamansari flat become a more humane living space across genders, ages, and abilities (Banerji et al., 2019).

In this activity, the planning method used adopts the Target Oriented Planning approach, which is planning thought that is more emphasized solely on the goals & objectives that will be achieved in the future (Yin et al., 2019). As for the planning of this prototype, the target referred to here is

the design prototype of a Simple Rental Flats - a row house that meets the building function criteria - occupant activities, performance/performance criteria - architectural criteria and is responsive to socio-economic considerations of prospective residents, in this case, are low-income people (Sheikholeslami et al., 2021).

FORMULATION OF THE PROBLEM

Humans have three basic needs, one of which is a house or a place to live. The house plays a vital role in community life as a place to live and foster a family. Indonesia is a country that has a low-income population of around 200 million people, and this figure will continue to increase to 260 million in 2020 (Roy & Juričić, 2019). This increase has resulted in the emergence of slum settlements, both in regencies and cities. Therefore, the government has launched the "1,000 Flats Tower" program in several big cities, Banten Province (Chen et al., 2020).

RESEARCH PURPOSES

We determine the best alternative in handling slum settlements through the development of Prototype Types of Horizontal and Vertical Residential Houses following environmental conditions in each Regency / City in Banten Province.

METHODS

In this study, the planning method used adopts the Target Oriented Planning approach, which is a planning thinking that is more emphasized solely on the goals & objectives that will be achieved in the future (Saffarian et al., 2020). Because research on cultural heritage buildings is still quite extensive and there are not many people who take this theme as the theme of their research. As for the planning of this prototype, the target referred to here is the design prototype of a Simple Rental Flats - a row house that meets the building function criteria - occupant activities, performance/performance criteria - architectural criteria and is responsive to socio-economic considerations of prospective residents, in this case, is a Low Income Society (Silverman, 2020). The method of stages in problem-solving can be seen in Figure 1 below:

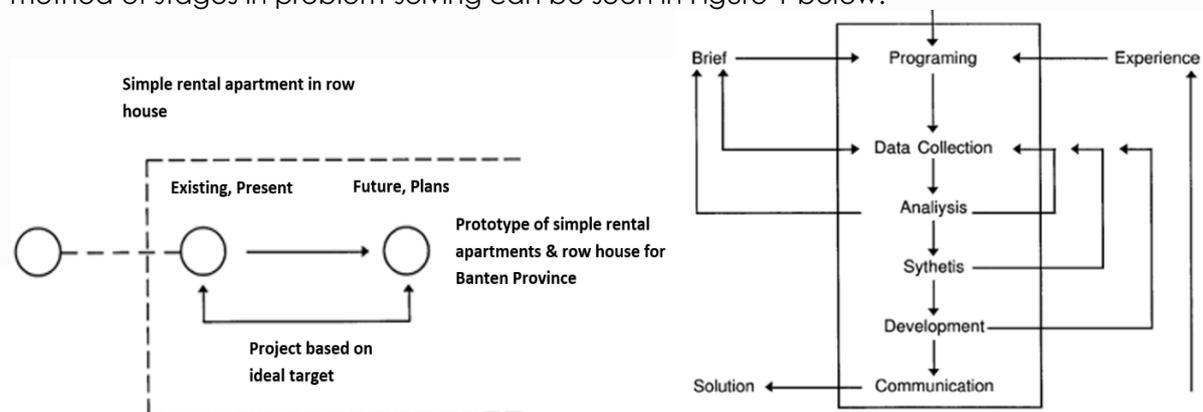


Figure 1 Principles of Target Oriented Planning Methods & Problem-Solving Planning Method

Because research on cultural heritage buildings is still quite extensive and there are not many people who take this theme as the theme of their research (Andiyan & Budianto, 2021). This research conducted in one construction company in Indonesia, the company was facing several problems, many projects that already ended have delays (Putra et al., 2021). To get an overview of the current conditions as a basis for designing a better future vertical-horizontal housing prototype, it is necessary to evaluate the vertical-horizontal housing built and occupied, which has been designed of course following the applicable NSPM. Because of that, the Post Occupancy Evaluation Method is deemed necessary (van Manen et al., 2018).

LITERATURE REVIEW

The basic approaches that must be considered in this investigation survey of horizontal and vertical house designs are as follows; (1) Functional Aspects. Row Houses and Simple Rental Flats are horizontal & vertical forms of housing with a building and various supporting facilities for its residents. The basic functional approach focuses on the actors of the activity, the type of activity, the activation process, the type of capacity facility, the amount of space; (2) Performance & Technical Aspects. Row Houses and Simple Rental Flats require a complete range of building facilities and are used to support the achievement of the elements of comfort, safety, convenience, communication, and mobility from inside and outside the building. Therefore, it is necessary to approach a building utility system that is good and needs it; (3) Technical aspects related to the main activities in rowhouses and Simple Rental Flats are residential activities. Therefore, there is a need for an approach to fulfill security and building safety elements by considering the choice of structural-modular systems & building materials/materials—the right kind of benefits. Therefore, this study is aimed at describing the application of Islamic architecture to the mass of the Cipaganti Mosque building, where the Cipaganti Mosque is one of the historical heritage buildings called heritage buildings in the city of Bandung (Andiyan & Aldyanto, 2021); (4) Architectural Aspects. The architectural aspects used in the planning of row houses and simple rental flats apply; (a) Development of simple healthy houses & simple high-rise Flats and also directions from the Ministry of Industry; (b) The appearance/face of the building will refer to energy-efficient architecture, a green architecture that pays attention to contextual issues with an image that is comfortable, safe, and affordable and accommodates architecture & local wisdom (Majid & Fauzi, 2021). (5) Social - Economic Aspects. In designing a prototype, it needs to be based on the socio-economic considerations of the people who will inhabit this house, namely; (1) The economic aspects used in the planning of row houses and simple rental flats are viewed from the efficiency of construction cost financing, the affordability of the potential occupants/users of the house; (2) The social aspect, planning this prototype is essential to consider the social conditions, social capital contribution, and living culture, which are likely to experience slight changes.

The approach used is geometry, and basic shapes, geometry and basic shapes show that architecture is an expression of humans and is a basic principle always present from a work of architecture. This theoretical approach is carried out to study artifacts, namely the Bandung City Hall Office, to see how the local architectural concept, in this case, Banten province, is applied. It examines how local content elements are transformed to suit their time. The approach used is geometry, and basic shapes, geometry and basic shapes show that architecture is an expression of humans and is a basic principle always present from a work of architecture (Andiyan & Albadira, 2021). The first process in transforming building artifacts is to determine a “pre-code,” a control tool. How to transform can be done with the following steps:

The main principle of the ATUMICS method is about the arrangement, combination, integration, or mixture of the essential elements of tradition and modernity; (1) Artifact (A) refers to an object that is the center of this study, namely Vertical Houses (Simple Rental Flats) -Horizontal Houses (Row Houses). The other six words, namely Technique (T), Utility (U), Material (M), Icon (I), Concept (C), and Shape (S), reflect the six essential elements of building artifacts/objects that will adopt traditional transformations. Local; (2) The technique (T) describes all kinds of technical knowledge, such as manufacturing techniques, production techniques, or how artifacts are finally formed either through processes, history, or other things that influence them. Engineering also means technology, which refers to all the means and processes in realizing the use of existing potentials; (3) Utility (U) used as a functional tool for an object. Utility or function has always been linked to the form. Judging from the semantic definition, the function has two definite: in the context of use and the context of the product/object. For example, in a carved chair, in the product/object context, the chair serves as a means of sitting, and in other contexts, a chair made with high-quality carving art will show the class or level of the user; (4) Material (M) refers to any physical form of things that can be made. In the field of architecture & interior, this aspect is usually emphasized on the final result of a product/building object (chairs, tables, doors, carvings, walls, floors, etc.); (5) Icon (I) refers to symbolic forms derived from nature (flora and fauna), geography, ornaments, decorations, colors, myths, people, and artifacts. The ‘icon’ element is to provide an iconic sign and symbolic meaning to an object; (6) Concept (C) refers to the factors behind the formation of an object. Concepts are measured qualitatively (habits, norms, beliefs, characteristics, feelings, emotions, spirituality, values, ideology, and culture); (7) Shape (S) refers

to an object's shape, performance, and visual and physical properties, including analyzing the size and proportion.

RESULTS AND DISCUSSION

The design components for the design of the Simple Rental Flats that have been determined are related to several design provisions as follows; (1) Criteria for Determination of Location and Land Conditions; (2) Criteria for Site Plan, Block Plan, and Building Form; (3) Criteria for Building Architecture; (a) Reflects its function as a residence; (b) Balanced, harmonious, and in harmony with the environment, beautiful but not excessive; (c) Efficient use of resources in utilization, easy maintenance; (d) Pay attention to safety and security; (e) Meet the demands of the local socio-culture; (f) Space must meet the requirements for ventilation, lighting, sound, and smell to protect occupants; (g) Natural ventilation uses a cross-air exchange system with a vent size of at least 1% of the floor area of the space concerned. Furthermore, when using artificial ventilation with a mechanical system, it must work continuously; (h) Natural lighting uses one or more light holes whose width is calculated from the skylight component, reflection from outside - inside, while artificial lighting must meet the requirements, namely min—50 Lux for work and 20 Lux for other spaces (stairs, hallways/corridors).

As for the architectural design provisions for Simple Rental Flats, include the following aspects; (a) Apartment units; (b) Shared Parts and Common Objects; (c) Residential Unit Standard; (d) Corridor / Hallway; (e) Stairs (General - Emergency) & Ramp; (f) Window; (g) kitchen; (h) Building material; (i) Inner Space.

1. Building Structure includes lower structure (substructure, upper structure, building envelope, detailing, construction method).
2. Mechanical, Electrical and Plumbing include: Fire Extinguishing Systems, Electrical Systems, Lightning Protection, and Plumbing Systems.
3. Public infrastructure includes roads, street lighting, solid waste management, green open spaces/parks/landscapes, parking, calculation of parking area requirements.

Overview of Banten Traditional Architecture

The traditional house of Banten Banten is a province located on the western tip of Java Island. This province is the result of the expansion of the West Java region, which was only inaugurated in 2000. In 2018 there were more than 2 million residents, with the development of an increasingly advanced population resulting in more productive population activities. In addition to increasingly productive population activities, the need for housing increases and becomes a problem, especially in urban areas (Andiyan & Nurjaman, 2021). Although administratively, Banten province is still relatively young, it does not mean that the people of this province are still culturally backward. Banten society's civilization itself had been built long before this province was formed. One proof of this is the existence of a traditional Banten house design originating from the Baduy culture of the West Banten. This traditional house called Sulah Nyanda is called a unique house because it has a design that blends in with nature.

Traditional House Structure

Judging from the building structure, this Banten traditional house as a whole is made of materials derived from nature. Bamboo is the main ingredient in constructing this traditional house, while stone, wood, and fibers are complementary to it. Stone is used as the foundation for the foundation. The stone used is a flat stone that is large to be buried in the ground. The stone usually obtained from this time is used to prevent the house poles from decaying quickly (Asnur et al., 2019). For information, wooden house poles will easily porous when directly in contact with the ground. Laying the foundation on a traditional Banten house is not done by damaging the soil structure. If the land where the house is built has sloping contours, then the foundation will adjust accordingly. This is what makes the height of the house supports cannot be equated. The pillar of the house itself comes from a large wooden block. The wood used for the posts must be solid and durable wood such as teak, mahogany, or acacia wood. Strong wood on a pole is essential for the resistance of the house because the pole is a place to support the roof frame and the floor frame. Figure 2 below is a picture of a typical Baduy house in Banten.



Figure 2 Banten Traditional House

For walls, this traditional house generally uses woven bamboo called bilik. The use of a booth provides coolness for the house's occupants because air circulation can quickly enter and exit through the wicker gap. To support the increasing mobility of the economy and population, rail-based mass transportation is needed with the characteristics of efficient, cheap, safe, and environmentally friendly (Andiyan & Rachmat, 2021). This is the reason why this Banten traditional house has no windows. Meanwhile, for the floor, planks are used, arranged parallel or bamboo that has been made flat (palupuh). The roof of this house uses bamboo and palm fibers. The bamboo slats are used as the roof frame, while the fibers are used as the roof. The fibers can also be replaced with alang-alang leaves that have been woven together (Ching, 2014).

Division of Space

The traditional house of Sulah Nyanda is still used as the primary residential design for the Baduy tribe in West Banten. To support this function, the typical Banten house is divided into several rooms, namely sosoro (front), tepas (center), and ipah (back).

Sosoro is located at the front of the house. In Indonesian, it can also be called a terrace. This section is used to receive guests, a place to relax, and a place for women's activities in the morning, for example, weaving.

Tepas. This room is used for family gatherings, feasting, relaxing, and sleeping at night.

Ipoh. This room is located at the back and is used as a place to store food supplies and a place to cook.

Concept of Vertical Building / Simple Rental Flats

In finding architectural solutions to existing problems, an approach is carried out by paying attention to the following aspects:

Functional

Analyze activities related to:

Residential Function

As the primary function of the area, it must be able to coordinate all functions of residential activities.

Social Functions

This area can provide a friendly open space for the people of Banten Province in particular, as a forum for social interaction for the community.

Integrate with the Environment

The area must be able to make an excellent contribution to the surrounding environment.

Visitor Behavior

In this case, everything about building design must pay attention (oriented) to all the characteristics of building users such as pedestrians, motorists, street vendors, etc.

Typological

The building must reflect the typology of the Banten architectural building by the local traditional architectural and residential functions.

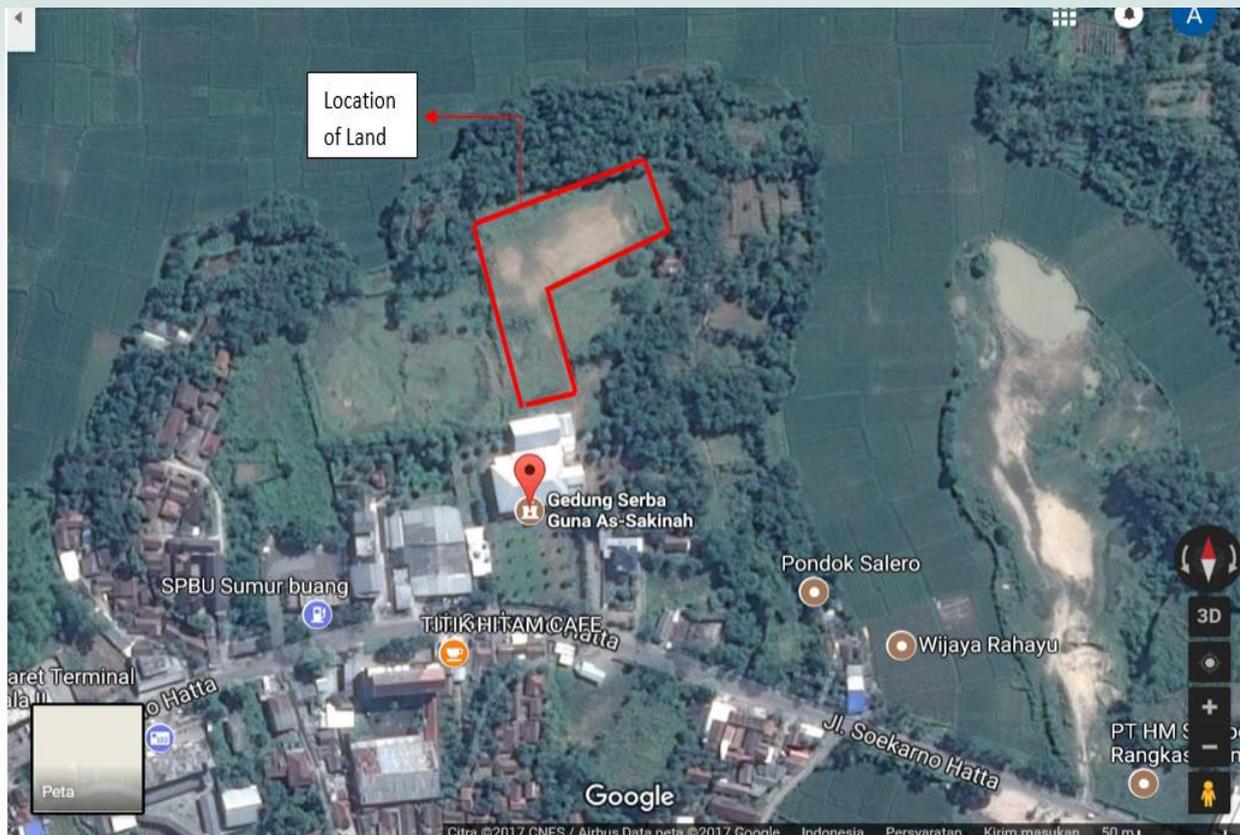


Figure 3 Land Location for Simple Rental Flats / vertical buildings

Based on the classification of users and activities in the Study of Prototype Development of Horizontal & Vertical Residential Houses in Banten Province, space is needed as follows:

Multipurpose Meeting Room

They are intended as a large-scale meeting room, seminars, Deliberations, Public Discussions, and other activities.

Area Waiting Room

The zone of residence of area watchdogs must be taken into account so as not to interfere with other functions but with easily accessible accessibility.

Open Space / Open Plaza

As a forum for interaction between local communities and domestic and local tourists.

Green Park

They are acting as area conditioning and playing a role in improving air quality in the surrounding environment.



Figure 4 The form of the apartment building for rent is simple & façade elements using local wisdom using typical Banten batik

The Concept of Building a Horizontal House/Rowhouse

In the Study of the Development of a Prototype of Horizontal & Vertical Residential Houses in Banten Province, the design criteria must be considered, namely as follows; (1) Physical Footprint; (2) Urban Aspects; (3) Environmental impact aspects; (4) Land Aspects; (5) Physical Building.

The things that are important to note in building design are as follows; (1) Building Mass Arrangement; (2) Home Architectural Appearance; (3) Building Orientation; (4) Building Materials; (5) Interior Layout; (6) Room Function.

It is advisable to implement a design module to determine the size/size associated with space requirements (column-free), structural efficiency, standard materials in Indonesia, furniture, and space for movement.

Material

The use of unique materials for indoors, following the stipulated finishing material requirements.

It is also possible to designate the use of special materials for unique rooms. As far as possible, efforts will be made to use domestically produced materials.

Maintenance

The building maintenance system should be based on the technical capabilities currently available. To the extent possible, avoid maintenance systems that require exceptional and too diverse tools. Maintenance methods must be efficient and fast. This paper aims to explore the application of Society 5.0 on the intelligent society component in Bandung Smart City as an accelerator of solutions for fair use of technology in education and health. This research aims to pay attention to the environment and social conditions of the boarding school to be a comfortable place for students to study because all activities are carried out in the Boarding school (Andiyan & Fauziah, 2021). Furthermore, for unique rooms, it is necessary to design a particular maintenance system as well.

This design must achieve integration between designs such as Architecture, Civil and Structures, Mechanical Electrical, Interior, and Landscape, which must be harmonious, aesthetically pleasing, and functional and meet security and safety requirements.



Figure 5 Typical floor plans of horizontal houses/rowhouses & facades use the local wisdom of Banten, namely the typical batik of Banten

CONCLUSION

Banten Provincial Government is planning the construction of flats and row houses in several locations in Banten Province. However, the flats and row houses that will be realized are currently being developed as prototypes for each of these dwellings. So that development progress will be on time. In terms of accessibility, prospective passengers are also optimistic that they will not be constrained (Andiyan & Rachmat, 2021). So that the flats and row houses that will be built according to the needs of the residents in them. Therefore, designing a simple rental apartment or row house that can support the community's needs regarding social and living comfort is necessary.

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