

Optimization Of The Use Of Private Rooms in Modest-Style Dwellings. A Case Study Of Densely Populated Settlements in Pademangan, North Jakarta

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ABSTRACT

Densely Populated Settlements (DPS) are a feature of urban areas; their existence is related to the conditions of urban life. The number of DPS modest-style dwellings in urban areas is increasing rapidly. Problems arise when a single dwelling, which should only be inhabited by up to three people, has to accommodate a number of occupants exceeding viable standards. Taking into account the limited space of DPS modest-style dwellings, this study aims to understand the use of private rooms in such dwellings. We employed a descriptive method, supported by data obtained through interviews and field reviews of residents in Pademangan, North Jakarta. Physical building data, such as room size, existing spatial functions and spatial arrangements, are used to identify and analyze the building conditions. The findings reveal that private rooms do not function appropriately. The focal issue in this case is the small land size, which ranges between 15 m² and 30 m². Moreover, the issue of rooms whose spatial function is combined with other functions only adds to the problems of private room usage, such as room size, which is often too narrow to be considered as comfortable for daily activities.

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1. Introduction

Life in urban areas is as promising as ever to anyone yet many people are struggling to find jobs in the city in order to improve their standard of living. This situation originates from the belief of those living in rural and suburban areas that working in the city means the chance to lead a better life, in spite of the competition experienced when living in the city. Urban areas have become a powerful magnet for migrants wanting to start new business opportunities. However, most of the labor migrants are low-skilled, owing to the fact that a large number of them move to the city due to family reasons and without any clear plan.

Among the problems arising from the large number of migrants in big cities is the

increasing need for shelter. The complex requirements involved to be acknowledged as an official inhabitant of the city, and their lack of skills and expertise, mean that migrants are unable to rent, let alone buy, their own home. Essentially, they will live in family homes or with relatives who invite them to come to the city. However, their family or relatives are also in a similar position, and do not have permanent residence. The availability of accommodation is not directly proportional to the number of migrants entering urban areas. As a result, they build temporary houses in empty areas of the city, such as on riverbanks, railroads and other places, both legally and illegally.

Because of the increased number of people living in Densely Populated Settlements (DPS), households are unable to expand their area of

land, although the number of family members who live there continues to grow. This phenomenon is the point of departure for this study.

The aim is to understand the use of rooms, specifically private rooms in modest-style dwellings. In terms of size, these dwellings are minuscule, and room usage can overlap with other purposes and functions. It is expected that this research will make an enormous contribution to the minimization of the adverse effects of modest-style dwellings, both physically and psychologically. In addition, we hope that the study will encourage the Government to build decent settlements for the middle to lower classes in urban areas.

2. Material and Methods

Dwellings as A Social and Cultural Space

A house is one of the primary needs of humans. Its reasons for existence lie far beyond simply that of a shelter. Suparlan (1996) argues that a house is not only a unit of physical space, but also a unit of social and cultural space, in which actions and interactions between the occupants of the house and its physical space reflect the classification of appropriate patterns of behavior that should be realized.

Sarwono, in Khalkali (2004), defines behavior as the visible and invisible actions of human beings. Overt behavior involves all the behaviors that the senses can immediately perceive, an example being is throwing or hitting, while covert behavior is a type of behavior that has to be investigated with a special method or instrument, since it cannot be directly captured by the senses. Examples of covert behavior include motivation, attitude and interests.. Furthermore, Siwi, in Khalkali (2004), states that the Stimulus-Response Theory of Dollard and Miller is an appropriate theory for analyzing how a behavior emerges. The theory has five components, namely:

- a) *Drives*: A need that can be divided into two, namely the primary drives (basic needs) and secondary drives (secondary needs). Primary drives are needs whose fulfilment is necessary, while secondary drives are social needs which are learned and possessed by humans.
- b) *Cues*: These are the choices and targets of responses a person makes to a particular situation. Needs require humans to do something in order to fulfill them; cues determine when, where and how the response is performed.
- c) *Response*: This is the reaction of a person after the cue-response relationship occurs. This component is possible cue is the choices and targets of the response itself. In this case, the response can also be seen as a preference for action.
- d) *Reinforcement*: This is the repetitive behavior of the same response or stimulus, or through a social learning process. A certain stimulus produces a certain behavior in a person.
- e) *Perception*: In principle, everything which is around us will be captured through the senses we have, such as temperature, sounds or light emitted by the environment.

Modest-style dwellings owned by middle- to low-income people in densely populated settlements in urban areas are generally tiny. Likewise, the room size of the dwellings is also very small. The main problem with this type of dwelling is the number of occupants living in it. Therefore, zoning, which should have clear boundaries, becomes equivocal. Zoning, which is applicable on both the tread and building scales, includes public, semi-public, semi-private, private and service zoning. Such zoning is impractical in extremely small buildings. For example, the main axis of a dwelling is the bedrooms; in normal-sized buildings their function is to provide a private zone which offers privacy for its users. According to Sarwono, in Khalkali (2004), privacy is a desire

or inclination in a person to not be disturbed in their solitude. In a modest-style dwelling, whose size is very small, the desire for privacy will never be realized.

The inappropriateness of the application of zoning to modest-style dwellings is due to the fact that every room in the building has multiple functions. For instance, a bedroom can function as an ironing room, which at the same time is used as a space for children to play. Likewise, in other spaces it is possible to have different functions in one room.

Room size has become a problem of concern. Limited space has led to the malfunctioning of rooms, both physically and psychologically. Moreover, it also results in a low number of users and furniture to support indoor activities. The spatial arrangement in a building will influence not only the interaction within each room, but also the formation of the building mass, whose impact will be seen in the aesthetic aspect of the shape and comfort of the building. The more compact the spatial arrangement, the fewer the opportunities to have ventilation and windows. According to Ching [1], the composition of a form can be changed in three ways: i) by adding another form (additive form); ii) by reducing some of the existing form (subtractive form); or iii) by changing its dimensions/size.

3. Results and Discussions

3.1. Case Study Review

This study examines the Densely Populated Settlement (DPS) in Pademangan, North Jakarta.

3.1.1. Environmental conditions

The environmental conditions can be categorized as a slum environment, with inadequate environmental sanitation. Issues contributing to the slum conditions are i) density of population, ii) negligence in maintaining the environment, iii) roads only 1.5

m wide with drainage channels on their right, which only flow intermittently, causing frequent flooding in the area during the rainy season. In addition, slums are also created by the limited size of the land and houses, meaning many activities that should be done in the area within the yard or in the home, such as washing and hanging clothes, have to be done in front of the house, which is in fact a public road area.

From the observations made in this area, we found that the settlements are generally permanent residences, with the outer buildings covered by plastered brick walls, and the doors and windows being wooden. The inter-spatial walls are generally partition walls made of plywood. The use of partition walls is not merely due to limited economic means, but is also caused by the narrowness of the buildings.



Source: Mauliani, 2017

Figure 1: The environment of the Densely Populated Settlement (DPS) in Pademangan, North Jakarta.

3.1.2. Social and Economic Conditions

Residents of West Pademangan area, especially in RT 4 RW 11, can be categorized as low-income, whose living is made from working in the informal sectors, such as massage, laundries and small shops. On the other hand, some residents have low-scale formal jobs, such as cleaning and gardening. A minority of them have middle income salaries by working as teachers or factory workers.

Most people who live in this region have occupied their houses for decades. The remainder are residents who have contracted the house from the owners, who have been able

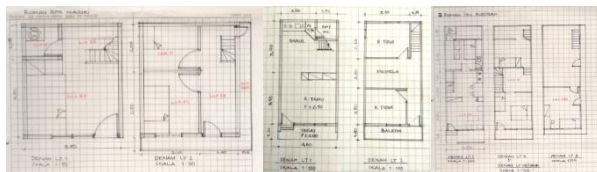
to improve their standard of living and now live in a better house.

3.2. Size and Spatial Arrangements Of Modest-Style Dwellings In Pademangan

In the case of densely populated settlements in Pademangan, the land area owned by each head of household (KK) is generally below the standard land area set by the government. The area for a modest-style dwelling should be 60 m², whereas in this densely populated settlement it is only between 15 m² and 50 m². With such a small area of land, it is impracticable for the residents to extend their buildings horizontally. Therefore, almost all the houses in this area have been extended in the vertical direction.

As previously explained, the existing houses in the Pademangan area are permanent. The structures and sheath of the building are made of concrete and plastered brick walls; only the inner areas use plywood partitions. For wet areas such as bathrooms and kitchens, permanent materials are used. On the whole, ceramic floors are used on the first floor of the houses. Moreover, the floors are elevated by 50 cm, to anticipate flooding.

The modest-style dwellings of Pademangan usually have 3 to 5 rooms, consisting of a living room, bedroom, bathroom, kitchen and balcony. Each room has a dual function, especially the living room, that is not only used to receive guests, but also for family gatherings, ironing, and at night is also used as a bedroom. The number of family members who occupy the houses ranges between 3 and 7 people and can consist of 1 to 2 households.



Source: Mauliani, 2017

Figure 2: Floor-plan of DPS in Pademangan. (left) 15 m² house, (center) 32 m² house, (right) 48 m² house.

3.3. Analysis of Modest-Style Dwelling Condition

The study examines the physical factors of the dwellings in terms of the size and spatial arrangements of the building, with a focus on the optimization of the usage of private rooms, specifically the bedrooms.

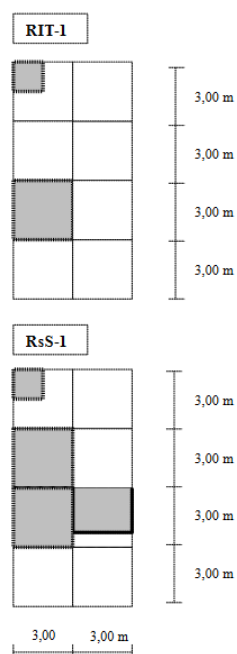
3.3.1. Room Size

The size of the land and building that any family owns depends on the income of the head of the family. Based on General Guidelines for Healthy Modest-Style Dwellings KEPMENKIMPRASWIL NO. 403/KPTS/M/2002 [3], income can be divided into three categories:

- (i) Low Income
- (ii) Very Low Income
- (iii) Informal Income

The government is targeting to provide healthy modest-style dwellings with standard size of 36 m² within these three income categories. Achievement of this target takes into account the development phase, in accordance with people's economic capacity. Hence, there must be a *Rumah Inti Tumbuh* (RIT), which is a house built as a temporary settlement, before people meet the requirements to live in a modest-style dwelling. The RIT must consist of at least one enclosed space that serves as a bedroom, one open space roofed area, which serves as a multipurpose room, and one bathroom.

The standard room size for a modest-style dwelling is 9 m² per person; with a standard threshold of 7.2 m² per person, RIT size is 21 m². This is further explained in the General Guidelines of Healthy Modest-Style Dwellings in relation to the modules that can be used to design the RIT.



Source: General Guidelines of Healthy Modest-Style Dwellings

Figure 3: The RIT Modules Standard.

From Figure 3, it can be seen that the RIT is about 6 m wide and 12 m long, with an effective land area of 72 m², while the width and length of modest-style dwellings in Pademangan range between 3-4 m and 4-12 m respectively. With such a minuscule size, it is difficult to develop the RIT into a Modest-Style Dwelling in accordance with Government standards.

Based on our observation of the room size of modest-style dwellings in densely populated settlements (DPS) in Pademangan, it has met the standard RIT size. However, if we consider the overall size of the building, these dwelling need to be redesigned in order to meet the requirements stipulated by the Government.

The size of a room can affect the occupants of the building, both physically and psychologically. White [2] divided room size into two parts, namely the size (P x L), and the height (T) of a space. He further explained that

the size of space affects its value (load or unloaded), determined by the capacity of the space, while the height of space will affect the emotions of the residents. The physical and psychological effects also apply to residential buildings, especially in modest-style dwellings. Based on our observations, the most important room measurement is room size (P x L), since most of the houses simply do not meet the physical needs of their occupants. Although it does not satisfy the room comfort requirement due to the lack of air and lighting, the length (T) is sufficient to meet the psychological needs standard (2.5 m - 3m). The root cause of the inadequate room size to meet physical needs is the fact that the number of occupants exceeds the maximum number allowed, which results in the overlapping of several functions in one room.

3.3.2. Spatial Planning

The spatial arrangement of the houses in Pademangan is generally well categorized, in the sense that public, private and service zoning are clearly separated. In practice, its overlapping use causes the zoning to be no longer appropriate as intended. Public spaces such as the terrace and living room on the first floor, service rooms such as kitchens and bathrooms are also on the first floor, while private spaces like sleeping rooms are on the second floor. The bedrooms that are included in the private zoning are sometimes mixed with public zoning due to the limited amount of space and the excessive number of occupants. At night, the bedroom moves into the living room.

3.3.3. Room Comfort

Comfort is the harmonious use of a room with other elements existing in it, such as shapes, textures, colors, symbols or signs, sounds, intensity and color of the light and smell. A person's comfort is usually influenced by the lighting and air. These two elements are crucial for the assurance of the harmonious living of the occupants. Rooms that have natural air

conditioning and lighting will also have comfortable humidity, so environmental health is maintained. In addition, having natural exposure and lighting is sufficient to save the electrical energy, because people do not depend on artificial lighting. Comfort can also be in the form of a sense of security and flexibility. The latter means that the size of the building and rooms affects the comfort level of its occupants.

3.4. The Effect of Spatial Size and Arrangements On The Activity and Behavior Of The Occupants

A house brings into the world individuals who hold principles. Whether these principles are good or bad is determined by the quality of the house itself, since it is where real knowledge and education begin. The role of space in a house, both in terms of size and settings, can affect a person's behavior significantly. It can be seen from the existence of zoning in the design of buildings, including that of the house. The zoning consists of public, semi-public, semi-private, private and service zoning. This is done to separate and distinguish between the activities of each occupant, so that every activity undertaken by them, both individually and collectively, will not overlap.

As an illustration, we provide an example of the importance of zoning. Among other purposes, spaces located in public zones, such as terraces and living rooms, are intended to accommodate the activities of guests. The living room is categorized as a semi-public zone, where people who can enter the area are its residents and those who have a close relationship with them. On the other hand, a private zone is a cloistered zone that can only be entered by the owner of the room. An example of a private zone is a bedroom, where all the activities are private and intimate to the user of the room.

In modest-style dwellings, zoning of areas becomes unclear because of the overlapping use of space. If the multiple usage of a room is still on a close zoning purpose, no significant

problems will occur, hence it is tolerable. For instance, a living room is also functions as a family room and an ironing room. Serious problems will arise if the types of room function are very different. For example, the bedroom is a completely private zone, but if used in conjunction with a guest room, then the privacy of the bedroom's user will be lost, which it will badly affect the psychological and physical aspects of the residents.

In modest-style dwellings in Pademangan, it is very difficult to separate private activities from public ones. This is especially true for houses with a building size of under 30 m², where the living room has two functions; it remains as a living room during the day, then becomes a bedroom during the night. Although modest-style dwellings have quite a relatively unappropriate private zoning which is placed separately on the second floor, when viewed in terms of size and spatial arrangements, the bedrooms are not entirely exclusive to the room users, as the room size only ranges between 5 m² and 6 m². Furthermore, the bedrooms are close together, and the dividers are only made from plywood.

Size, spatial arrangements, and the use of partition wall materials in the sleeping room are factors which enable the occupants to see and hear sexual activity from adults in the house. This leads to inappropriate underage behavior. According to Dollard and Miller's Theory of Stimulus-Response, perceptions can arise from events around us that are captured through the senses.

Therefore, things that occur in the bedroom can be captured by the senses of the people who see or hear them. What is captured by the senses will then turn into perceptions, which can be either positive or negative. Children have strong memories of things that they have seen or heard, while teenagers or adults will have different responses to them. The main concern of the limited boundaries between the rooms in

the modest-style dwellings is the perceptions and responses which can lead to negative behaviors, such as sexual activity before an appropriate age, sexual violence and other negative actions that could emerge.

There are many other behavior-related problems that could occur due to the aforementioned issues in modest-style dwellings. Their small size results in small room size, which can cause a change in the activity of their occupants. Due to the miniscule size of the rooms, many indoor activities are moved to the area outside the house, such as family gatherings, sewing by hand and washing clothes. In addition, this can cause children and even adults to stay away from the house after their activities at school or work, only returning home when they have to do their homework or when they have to rest at night.

3.5. Optimization of Private Rooms

3.5.1. Application of the Concept of 'Rumah Inti Tumbuh' (RIT)

A healthy modest-style dwelling is a standard house from the government dedicated to low-income people, developed from *Rumah Inti Tumbuh* (RIT). RIT itself is a temporary house which is built to accommodate low-income people before they can actually afford a healthy modest-style dwelling. Standardization of space in RIT uses a module size $3 \times 3 \text{ m}^2$, which is based on a standard requirement of space per person equal to 9 m^2 with a minimum threshold of 7.2 m^2 .

3.5.2. Spatial Arrangements of Modest-Style Dwellings

It was mentioned in the previous section that the usage of rooms in modest-style dwellings in densely populated settlements overlaps. For case in a point, the living room is used not only as a reception room, but is also used for family gatherings, ironing, and sleeping at night. In some cases, the living room even becomes the center of activities. On average, the living room size ranges between 9 and 12 m^2 , while other

rooms such as bedrooms have an average size of $3 - 5 \text{ m}^2$.

The use of the living room for multiple purposes has led to a mixture of public, service and private zoning. The mixing of public with service zoning for people in densely populated settlements can still be tolerated if considered from two angles: i) the very small size of the land; and ii) the houses that are situated close to each other. This encourages the occupants of these homes to be open, in the sense of being able to accept their living room as a gathering place for neighbors. Road access in front of the house also becomes a gathering place in the morning and afternoon, especially for mothers and children under five years old.

The other reason for the mixture of public and service zoning is the limited size of the rooms in the modest-style dwellings. In densely populated settlements in the western Pademangan region and also in other densely populated settlements, this limited room size means there is no room for laundry activities. Hence, these activities must be performed outside the house, in the road area to the front of it. After the clothes are dry, the ironing activities will be done in the living room, whose location is very close to the washing and ironing activities. In addition, gatherings with neighbors are unavoidable.

The most focal issue which the architect must consider is the problem of mixing public with private zones. As explained earlier, the living room will turn into a bedroom when night comes. In addition, this does not take into account age and gender differences.

In the zoning of the house, the bedroom is in a private zoning area, in which the occupants can perform any activity freely without being disturbed by others. From this, it can be understood that a bedroom can only be used personally by either a married couple or individually by a child. Based on religious and

cultural beliefs, the separation of bedrooms is based on age level and gender. Children under the age of five should have a separate bedroom from their parents'. Likewise, children of different sexes should sleep separately. The small size of the rooms makes it difficult to implement these standards in modest-style dwellings.

Based on our observation during the research period, it was found that parents who still have children under five years old and even pre-teen children (elementary school age) have no choice but to share their bedroom with them. As a consequence, parents must be able to anticipate when they can conduct activities which are private to a married couple. In general, parents choose to do these activities when they are certain that the children are fast asleep (for children who are still toddlers), or when the children are already outdoors in the morning (for children who are already pre-adolescents), with the consequences that the parents delay going to work in the morning. Although behavioral aberrations can be caused by numerous factors, the size and spatial arrangements of the house make a significant contribution to the occupants' behavior.

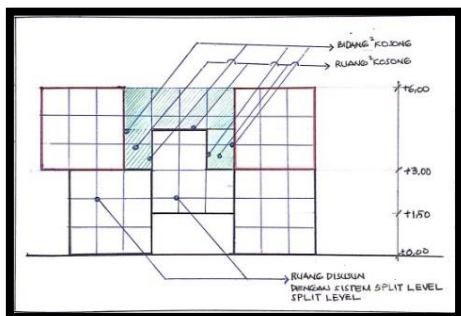
In the spatial analysis section, it was explained that the spatial arrangement of modest-style dwellings in Pademangan has met minimum requirements, in the sense that there is already a separation between public and service zoning and private zoning, with the former on the ground floor, and the latter on the top floor. In the new plan, this arrangement based on zoning will be maintained, but it needs to be clarified in terms of space usage.

The limited number of rooms (3-5), which includes the service rooms (bathroom and kitchen), will be optimized in terms of their function and usage. Optimization of the use of space is mainly intended for bedrooms, both those of parents and children. The children's bedrooms will be separated according to sex;

age is not a priority issue, although age-based separation is feasible if the occupants' economic situation has improved.

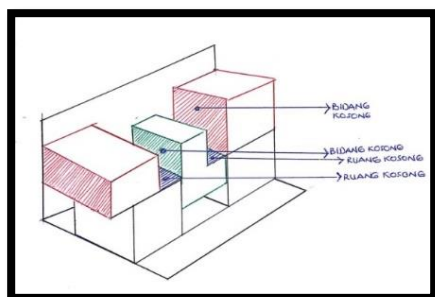
A house which only has two bedrooms, or sometimes plus one, as a living room could be an additional bedroom, should have one additional new bedroom. If this is unfeasible, then the arrangement and use of the living room as a bedroom should be adjusted with a flexible interior space arrangement. Based on the possibility of module development of the size of the space in the vertical direction, the addition of a room in modest-style dwellings also needs to be done in the vertical direction. Ching [1] maintains that a form can be changed by adding, subtracting, or changing the dimensions. For the design of modest-style dwellings, the methods of addition and subtraction of forms (additive and subtractive forms) can be applied, both for the purpose of building in the vertical direction, as well as to incorporate natural lighting and air into the house.

During the process of development in the vertical direction, the spatial arrangement in the modest-style dwelling design can be arranged as a split-level system, an arrangement made by not raising the room as high as one floor. A split-level system means raising the space by half the height of the current space, with the position $\frac{1}{2}$ height of the upper upper chamber is at $\frac{1}{2}$ of the upper upper space height and $\frac{1}{2}$ the top of the upper chamber is in the upper $\frac{1}{2}$ position of the lower chamber. There are several advantages of adding a room with a split-level system, including the addition of a number of rooms, separation of the room functions, and optimization of indoor lighting and air.



Source: Author's Idea Sketch
Figure 4: The Room Layout With Split Level System.

A reduction of building's shape can be applied to the design of modest-style dwellings, especially for the purpose of incorporating natural lighting and air into the house. The reduction of shapes method is the most appropriate method to be applied to this type of dwellings, considering that the houses that are interconnected. Similar to a split-level system, the reduction of shapes allows the formation of rooms and empty areas between spatial arrangements.



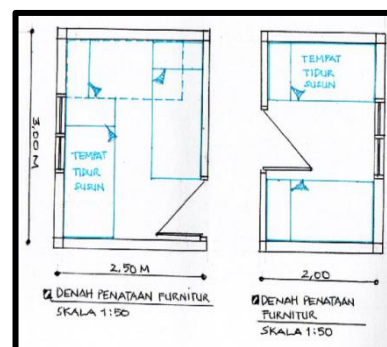
Source: Author's Idea Sketch
Figure 5: The Application of Shape Reduction.

3.5.3. Gender-based Spatial Planning

Gender-based spatial planning is based on the rules and norms of the religion and culture prevailing in Indonesia, which very strictly demand the separation of rooms, especially the bedroom. It was mentioned previously that gender-based spatial planning is absolutely necessary, while age-based spatial planning is possible if the householder is economically

capable. Separation of the bedrooms by gender is accomplished by grouping the girls in one bedroom and the boys in another bedroom. Arrangement of the furniture in the bedroom can include bunk beds, with a maximum capacity of four people in one bedroom.

The size of an individual bed (for one person) is 0.9m x 2m, and the minimum room size is 6 m² (2 m x 3 m) for a maximum capacity of four people. Based on this, the minimum threshold of a healthy modest-style dwelling of 7.2 m² / person is difficult to achieve. Even if this minimum threshold cannot be met, the effort of creating a suitable bedroom has been pursued through gender-based spatial planning and the availability of lighting and clean air in the room.



Source: Author's Idea Sketch
Figure 6: The Furniture Layout Inside Bedroom.

4. Conclusion

The emergence of negative behavior in the community can start from issues arising at home, such as the size and spatial arrangement of the house, especially in modest-style dwellings. To name a few, the inappropriate arrangement and the diminutive size of private areas such as bedrooms; the use of non-permanent spatial material (timber triplex, gypsum board); and the use of shared bedrooms by parents and children are among the problems which could escalate the probability of negative behavior by inhabitants.

From the utilization of the functional side, the optimization of private areas can be achieved by rearranging the rooms in the house; for example, by making a clear separation between boys' and girls' areas, as well as arranging the area vertically with a split level system. When the occupants are content with their house, both in functional and physical terms, all the activities there will be improved and the negative behavior resulting from poor architecture can be minimized.

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