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# The Role of Minimizing Residential Plot Area and Width in Characteristics of Spatial Organization for Urban House Spaces in Mosul City

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Plot Area, Spatial, Urban House, Mosul City.

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**ABSTRACT**

The increasing costs of providing a residential unit is the main reason behind the residents well of minimizing the area of the plot which forms the big burden within the total cost. This change of the dimensions and area of the residential plot is expected to influence the functional plan of the residential unit . It is necessary to study this expected effect in creating some diversities on the functional pattern of the residential unit as a matter of fact ,which is known to be well-established with the bigger areas of the residential unit. These patterns could form new adaptations for living style towards the change in proportions and dimensions of the residential plot. Although some specialized studies have provided diverse functional patterns for functional organization following the variations of residential plot dimensions, the research points out that there is no full competence of the functional view created from the real effect of such variations, therefore the research problem is set to be" there is no clear theoretical imagination of the effects of minimizing the dimensions of residential plot on the spatial organization plans of actual residential units. The aim of the research is to limit the spatial organizations expected to emerge in actual residential units because of the variations of the dimensions of a residential plot and its ability to provide more economically appropriate models within the minimum areas the residential plot. The research hypothesizes that minimizing the width and the area of the residential plot leads to spatial organizations which form new adaptations of social needs for residents.. These six models represent the reliable areas and proportions adopted in dividing the city within applied partitions. The research the smaller residential plots, which were evaluated according to a scale to correspond with achieving the social needs within the concept of affordable residential unit.



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# دور تقليل مساحة وعرض القطعة السكنية في خصائص التنظيم الفضائي لفضاءات المسكن الحضري في مدينة الموصل

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الخلاصه

شَكَّل ارتفاع كلف توفير المسكن أساساً لرغبة الساكن في تحديد مساحة القطعة السكنية والتي تشكّل العبء الأكبر ضمن الكلفة الكلية. ومع التأثير المتوقع لتغير تناسبات القطعة السكنية ومساحتها على المخطط الوظيفي للمسكن, فإنه من الضروري دراسة هذا التأثير في خلق بعض التنوعات على النمط الوظيفي للمسكن في واقع الحال والذي عُرف بثباته مع المساحات الأكبر لقطعة السكن. ويمكن لهذه الأنماط أن تُشكَّل تكيفات جديدة لنمط المعيشة إزاء التغير في تناسبات وأبعاد قطعة السكن. ورغم ما قدمته بعض الدراسات المتخصصة لأنماط وظيفية متنوعة للتنظيم الوظيفي بتنوع أبعاد القطعة السكنية إلا أن واقع البحث يشير إلى عدم المعرفة الكافية بطبيعة النظرة الوظيفية التي ولّدها الواقع الفعلي بفعل هذا التأثير وبذلك فقد تحددت المشكلة البحثية "بعدم وجود تصور نظري واضح للتأثيرات التي رتبها تقليل تناسبات قطعة السكن على مخططات التنظيم الفضائي للمسكن المنتج في واقع الحال"وجاء هدف البحث بتحديد التنظيمات الفضائية التي يتوقع انها تولدت في الواقع السكني نتيجة تغير أبعاد قطعة السكن ومدى قدرتها على توفير نماذج اكثر تلاؤما مع المفهوم الاقتصادي للمسكن ضمن المساحات الادنى للقطعة السكنية." ويفترض البحث" أن التقليل في عرض ومساحة قطعة السكن يمكن أن تولّد تنظيمات فضائية تشكل تكيفات جديدة للحاجات الاجتماعية للساكن. وتمت معالجة المشكلة البحثية من خلال اختيار عينة مؤلفة من (158) نموذج لوحدات سكنية توزعت على سته مجاميع بمعدلات مختلفة لكل مجموعة. وتعبر هذه النماذج الستة عن أهم المساحات والتناسبات المعتمدة في تقسيم الاراضي السكنية في احياء مدينه الموصل وضمن الافرازات المعمول بها استخرج البحث جملة من المخططات الوظيفية الجديدة التي عبرت عن التنظيم الفضائي للقطع الاصغر للسكن وتم تقييمها ضمن تدرجات للتوافق مع تحقيق الحاجات الاجتماعية ضمن السكن الميسر.

## 1. Introduction

### *1.1.Its placement*

The residential plot forms one of the main housing_market elements, which_follows the acts and politics of different governments. These acts and politics are cleared through the laws and systems which were put from the government for Many people tend to divide the residential plot which is distributed in length into two parts to exploit the plot in building two separated residential units [2],by trespassing the conditions and local legislations concerning the accepted minimum limits for the area of residential plot or its front width with a the justification that this option provides a real guarantee of residence within the current economic circumstances for a big section of the population of the city .The high Table 1. shows the proportion of actually partitioned and not partitioned plots in Mosul city, which showed that the proportion of residential plots divided for building clearly exceeds the residential plots which were exploited without division. This phenomena has increased, which clearly represents the big gap among the reliable design limitations in the city and the effective procedures in housing market. These procedures witnessed in the housing market in the city represent, as the survey sample showed, the real procedures which become too clear in most urban cities in Iraq, but today more sharpen and severity ranges are witnessed in Baghdad city where the severity ranges for housing needs. This indicates that the continuation of the failure to meet the increasing demands of residential units in the city without controlling the areas of the partitioned plots effectively, will result in more hardness operations to repeat the housing division which may form out controlling mismanage for the housing environment of the city.

planning the use of plot or through the projects concerning infrastructures that provide them to the residential areas[1], concentrating on the view to housing reality, the urban housing sector witnessed an increased high in the prices of the residential plots, as shown in Fig.1.

prices justify the wishes in minimizing the dimensions of the residential units to the minimum values from the dependable ones to control the costs of housing. The high prices also formed the basis of exacerbation of this phenomena, which is cleared by the results of the survey achieved by the researcher for some quarters of Mosul city for the year 2013, are shown in Table 1.

### *1.2. The problem of the research*

There is no clear theoretical imagination for the effects that resulted from Minimizing the proportions of the residential plot on the designs of spatial organization of produced housing in effect.

### *1.3.The aim of the research*

the aim of the research is to limit the spatial organizations which are expected that they are resulted from minimizing the dimensions of residential plot in effect of housing, and the ability of those organizations to ensure models more convenient with the economical concept for housing within minimum areas for residential plot.

### *1.4 .The hypothesisof the research*

Minimizing the area and the width of the residential plot may result in spatial organizations which may form new adaptations for the social needs of the residents.

### *1.5. The methodology of the research*

In order to achieve the aim of the research, firstly the theories which have discussed the subject of residential plot with its different aspects in Mosul city only. The research deals also with the limitations of organizing the residential plot in housing political programs in Iraq. The research also deals with the most important studies, which discussed the variation of the proportions of residential plot and their effects on the spatial organization in housing. The problem of the research is solved through choosing the sample, which consists of (158) models of residential units distributed to six groups with different rates for each group. These models express to the most reliable areas and partitions in dividing residential plots in the quarters of Mosul city and within a dependable partitions. The research concluded that there are new functional designs which expressed the spatial organization for the smaller plots of housing and it is evaluated by a scale corresponding to achieving the social needs within available housing.

**2. limits of minimizing the residential plot in programs and politics of housing**

. In 1950s and 1960s, the residential plots which were given to the officials were (600m$^2$), that is a dominated trait in distribution process. After 1975 and with the increasing prices of residential plots and with the exaggeration of housing crisis, the state (government) tended to reduce the partitioned and distributed residential plots until the area reached 200m$^2$ for each residential plot. This happened through enacting law No.(5810 for the year 1980) [3], Though, what resulted in that period on housing design These required procedures clearly expressed to the need to review the special directions in dividing residential plot s to be more convenient with the public housing design standards in reducing the minimum limits of the area of the residential plot to (150m$^2$ ) as a minimum limit or what is desired from special local offices[1] **(by pointing to the demand of Nineveh municipality / department of building permissions to the specialized Ministry to amend paragraph one for the resolution 940 in 21/12/1987 to allow for plot s partition in the city with area not less than( 150 m$^2$ ) and front wide not less than 7, 5 m**. It is very necessary to obtain these agreements. The organization of the areas of residential plot was the basis in first level from appearance the public housing design standards, which limited the area of a single housing between (600-150)m$^2$ [4], but the actual application resulted to distribute the residential plots under (200)m$^2$ as a minimum limit. The distribution politics ignored the response to a full range of demanding the housings on the basis of income and the characteristics of family, which make most of families were not able to bear the costs of these rules and deprived from the additional chances that provided by diversity and the reduce of the of residential plot to get on acceptable housing, and solve the housing crisis[5].The Minimizing of the area of residential plot, which is provided to the family to take benefit from the suitable residential plots in the city or what provided by the limited width of the residential plot to control on the costs of the necessary infrastructures for the housing quarter. These two designs factors are very important in economical accounts of housing market in economics accounts of the plot. This assured by Alnema study. The study gave the evaluation for the area of residential plot, and showed the range from (600-360 )m$^2$ pointed to waste in areas of outer spaces and waste in the areas of inner building too, but the areas between ( 360-150 )m$^2$ provide a balance in housing areas [4] as shown in Fig. 2. The study also limited the favorite proportion of the dimensions of residential plot with (2/3) and the acceptable proportion equals (1/2) and the non-favorite equals (1/1) and when the proportion is increased on that the proportion is not acceptable [4].

programs of housing politics in Iraq. These politics were cleared because of the problems of providing residential plot s according to the conclusions of public housing design, which focused (as shown in Table 2. on the classification of residential plots with minimum limitation in order to actually control it. The table shows the areas of single urban housing, which is classified by the study according to the uncovered fronts into four types and limits, which their areas were considered as a study of public housing design in Iraq, which dealt with the housing standards in details. Although the results of this detailed study as well as some resolution which issued in 1970s which aimed to limit the partition areas. But actually that results from housing weakness is

[1] Private meeting is done from the researcher with the senior engineer ( Tariq Mahmoud ) Nineveh municipality office / department of building permissions, who issued a letter to the administrative section /constructional design in Baghdad to amend the paragraph one from the resolution 940 in 21/12/1987 and review the partition of housing plot with areas not less 150 m$^2$ )and with front wide not less than 7, 5m.

surely different from the required standards and the main reason is back to stop working with the public housing design because of the circumstances that country faced during 1980s and 1990s for the twentieth century [6].

### 1.2. spatial organization in the public housing design

The spatial organization is defined to find the suitable site and convenient dimensions to achieve the required design to be correspondent with the resident needs [8] and it represents social reality and an expression of social actives for individuals and groups, whom they live in .The relations of individuals with each other and their mutual social relations are cleared in spatial organization [9].Because of the importance of spatial organization for housing and in order to These functional types depended on dividing the housing into three main parts according

Through discussing these types, we could conclude four different solutions of spatial organization come from the difference and the degrees of incorporation processes among different living space. The design (A)included separating for all their actives details, while the design (B) included the incorporation between two actives (food +living ) in one space and the design (C) included the incorporation of two actives (reception + living ) but the design (D) included the incorporation of the active (reception + living + food )in one space. These spaces occupied their sites in the beginning of the design and occupied the sites which are less deep in these designs, but the service spaces were variant in collecting them. The two designs D, C collected two actives (cooking +store ) in one space, the design focused on putting this active in the depth

### 2.2. The limitations of residential plot and spatial organization in housing reality

Although the big depth for housing, and what public housing designs provided in Iraq , the actual housing is still distributing the residential plot with an area of 200 $m^2$ and with front width of 8m and does not take in consideration the minimum limitations for residential plot, which were recommended by previous studies. These big areas of the residential plots were qualified because most of the existing housing designs in actual housing depend on the type of functional relations. This was affirmed by Al. Sanjary study and this study deals with analysing a big group from a single housing for the family in urban sector and within the zones of the area of Although the design included the existence of the three main zones, which design types were depended on, but the functional organization for the actual sample showed more than one main difference, that the first included, the complete achieving the correspondence with resident needs in housing, the public housing design is based on describing groups of guidance functional designs which interpret the style of housing unit with its different dimensions, that the functional designs included the realization of the variation in style of relations among actives and included different styles from incorporation among actives to achieve the maximum in Minimizing the housing areas, which, in its results, limited housing models for zones ranging between (600-150 $m^2$ )for housing g plot where four types of main functional designs were put ( a, b, c, d) for available housing which is provided as an economic and social solution for the crisis in Iraq, as shown in Fig. 3. to its specialized degrees as shown in Fig. 4.

of housing functional organization with bigger length about the relation with outside, while the design (D) included the collecting of two actives, bath and w.c with bed actives in housing. These variations formed a picture of the variant effect in the area of residential plot through actives incorporation in functional design, which is limited by planner of designs which ranges from (600 to 150 )$m^2$.these effects appeared in their bigger form in functional design of the type (D), which is the best economically.Thistypewitnessed incorporation more than one active in one space, appearance of the open organization and cancel the unexploited spaces to reach Minimizing the total building area and Minimizing the area of circulation spaces in housing where the area of the residential plot decreased to the minimum limitations reaching to150 $m^2$, as shown in Table 3. residential plot s between (200 to 350) $m^2$ and indicated the existence of typed formula of functional relations among some spaces for these housings, which the design process publicly depend [10] this study also provided the relations with functional design which expressed to more than 75% from the sample, as shown in Fig. 5.Adequate housing is a human right and one of his basic needs[12].basic commodities such as education and health, and governments, whether in developed countries or

In developing countries, it is the responsibility of ensuring adequate and adequate housing for all segments of society. [13].

Obtaining it in a suitable environment incorporation processes were little among living actives on the level of spatial organization while on the level of space depth, the kitchen active was too little, which based on the housing advanced and in direct touch with the outside unlike the

public design models of housing, which assured the existence of this space in the level of more depth housing. These discovered variations could be interpreted between the two parts. The disappearance of the processes of spaces incorporation may be backed to the area of residential plot s, which were discussed and ranged within the limitations of the area, which the most were more than (200m$^2$ ) in area, while the solutions of housing design expressed to treat plots with a bigger range for the area and with less minimum limitations, that encouraged to many solution types in front on keeping the functional type solution for the study model (Al-sanjary), as shown in the Fig.5. while the difference sample of the a spatial depth for kitchen active, which can be understood through the nature temporal difference among the timing of doing the two studies and the nature of the aimed sample of these two studies, while the study of al sanjary aimed at a contemporary sample in that time ( the more updated study). The study of design, while it was old, but its sample was comprehensive for the public housing, which explained the discovering of variation model for the nature use of this space, the style of achieving the active in it, or its area and its role as space for living life for the family during a day as well as its role as a service space. This difference could interpreted the variation in assured this space between the two studies

**3.The problem of the research**

The Minimizing the area of the residential plot and its front width points out that new changes could be happened in spatial organization of the housing units out of housing politics controlling and the directions of design authorities in Iraq. This is what the study of (Al-Nueimi and others) assured, which pointed out the role of changing the areas and their proportions of residential plot (width, length) to achieve many functional designs to be more convenient for different actives. The study concluded that the most effected housing space in changing the area and its proportions were ( reception and living ) spaces but the space of bed room and kitchen and stairs gave a high degree of stability, the study also pointed out that the space of living and reception could form a passing point to the other space especially (300m$^2$ ) with increasing the front The study showed many presentations, but it restricted to the first one, which is not raised the changing relation in area characteristics for spaces and functional organizations and their formed traits with the variation of residential plot dimensions and proportions and with the existence of many processes for dividing the width and minimizing the length of residential plot. The study also indicated each of housing actives, because of the difference in spatial depth for housing actives with the proportions of residential plot even with stability of the area of residential plot. The study showed the differences in the level of the length over the outer space to achieve its distinctiveness [2],The study of (Shamsulddin) provided, with this understanding and with the beginnings of the last century and the increasing effect of area limitations for the dimensions of the residential plot and its shape changes, a new functional types which represent the changes that that happened on the spatial organization of housing, that resulted from the changes occurred on housing, for example cancel and void some spaces, because of decreasing the area of residential plot such as (corridor, w.c for guests, food space for guests, store space, and external garden ). The study also pointed to incorporate the actives, which were accepting the incorporation such as the incorporation of living and reception actives in one space, and also pointed to the reception space which its function was not to receipt the guests only but it became a transition spatial too. (the interference of spaces when the reception space interferences with circulation space).The living space also interferences with circulation space ).The living space also interferences with the middle distributor where this spaces formed a tie of the vertical and horizontal circulation inside, the housing, with public spaces (reception ), and the privated spaces(bedroom), services ( bath room and kitchen). The privated may be distinctive, therefore the families spent most of their time with rest and security in it. It may return the picture of the middle spatial through its central site and the likeness of its functional relations, as well as the incorporation of bath and w.c spatial and placing the bedroom space at the end of housing to give a high distinctive. But the kitchen space, as the study pointed was placed beside reception in housings, which their front width was more than 6m or often was placed after reception space in residential plot with tightened front, it is entered to the kitchen space through it as common in the second stage of this decade by using opened kitchen, which exploited the dimensions of the space ideally as shown in Fig. 6.

residential plots, which is really the problem of the research, "because there is no specialized study to show the nature of spatial organizations that actually formed". The public aim of the research was realized " which included finding out the spatial types which could be created by changing the residential plot dimensions towards

reducing the costs and far from lawful limitations, to evaluate these types economically". On this basis, the research will limit a defined environment for study which includes choosing the contemporary urban hosing environment for Mosul city and within housing quarters for middle income to consider the importance of the city is one of the main city in Iraq. which suffer from clear points for housing crisis in it.

**4.The selected sample for field study that expressed the actual situation of Mosul city**

The selected sample consisted of group of residential plot s which must achieve the following:

1-The front width must be less than (8m)

2-The area must be less than ($200m^2$ )($160m^2$ )a maximum limitations

3- The length of the residential plot must be 20m as a minimum limitation

The two first conditions included the survey sample housing g plot out of the allowed limitations of the current partitioned plot s according to the valid legislations which conditioned that the area must be not less than $200m^2$ and its front width must be not less than (8m).while the third condition which represent the minimum limitations of the length of residential plot s, which were distributed in the city to achieve the economical side in their proportions on the planning level, therefore the study avoided the corner plot s that may include length less than 20m and restricted to select the residential plot s that generated from the length partitioned for residential plot s, which were selected from group of relatively modern quarters that the prices of residential plot s were median among the quarters that the prices were high and the distant quarter that their prices were low. The sample expressed to the median limitations that let the residents of the city able to bear the costs of building, within these considerations, the sample was selected from group of quarters as shown in Table 4.

1- **Alkindi Quarter**: The residential plot s of this area were distributed in 1990s, the amounted residential plot area publicly in the quarter was $300m^2$ with dimensions(12*25 ) which helped in dividing the residential plot s into two residential plot s with a total area $150m^2$ for each one.
2- **Alhadbaa Quarter**:This quarter consists of 2000 residential plot s, which were distributed in 1983.The area of these plots of residential plot s ranged between $200m^2$ to $240m^2$ with dimensions 10-12 *20m which helped in dividing them into two plots of plot with dimensions 5-6 *20m.
3- **Alsukar Quarter**: This quarter is too large, and was distributed in 1980 with different dimensions, the area of the residential plot amounted $300m^2$ with publicly dimensions (12 *25) which helped in dividing the residential plot into two residential plots with area $150m^2$ for each one.
4- **Alrifaq Quarter**: This quarter included two groups of residential plots with areas between $240m^2$ -$300m^2$ with different proportions that helped in dividing them into ($12om^2$ -$150m^2$ ).
5- **Almaliya Quarter**: This quarter included the quarter which was distributed in the late of 1990s to the militaries with area $300m^2$ and width between ( 10-15 m) with dimensions (10 *30 )or ( 15 *20 ).The quarter witnessed a big engagement in buying with high prices from social groups, which are economically empowered.
6- **Albaladyat Quarter:** The areas of its residential plots were variant among (240-250-300 )$m^2$ that helped in dividing them into (120-150)$m^2$.
7- **The Second Alkafaat Quarter**: This quarter consists of 1000 residential plots, most of them were distributed to the instructors of Mosul university in 1985.The area of each plot is $300m^2$ publicly with dimensions (15 *20m).The instructors of the university are the most in the quarter with a limitation ratio from other groups that helped to divide the plots into $150m^2$.

### *4.1.The special results of spatial organization for survey sample in housings*

This part discusses kinds of spatial organizations for housing actives which could be observed within survey sample. In this part will be treated on the basis of housing classification into group of zones which included:

1-The semi –public zone (guests zone )

2- The semi – private zone (family living zone )

3-The private zone (family bedroom zone )

4- service zone

It is important to limit the three zones about social face of the housing functions which organizes the family relation with the guest and the relations among individuals in organizing the relations among housing actives, the interest in separating service space from interested in economical aspect in housing design, because it is very important to achieve that with an exceptional costs and facilitating the recognition of the interference style of this extent within the family live actives. This also includes analyzing and classifying housing samples on the basis of the relation among different actives through incorporation states and separating among them and the hierarchy of its spatial depth with the extent of the changing, which is related with these

relations of changing area of plot and its front width. The analysis showed groups of main types for functional designs of spatial organization which showed the spatial depth to place the actives and the incorporation relations with each other. The classification depended on observing the different actives for the reception space l in housing, which were limited by the study with four main relations. According to that relations, four main types were formed, and for each one group different models appeared, which they limited by the study as a branch pictures for each type. Below the details of the main types and their main traits and their details.

#### 4.1.1. Type - 1

The existence ratio of the type is amounted more than (%55,7) from the total sample. The sample provided four main models for this type as shown in Fig. 7. and Fig. 8. which its design includes an independent space for reception that occupies the front of housing, which is participated in kitchen service active, leaving living actives behind with a big degree of spatial depth and the different bed spaces are followed. The two first models for the type formed a bigger sample for it, as shown in Fig. 7. which showed the spatial depth design for the two models with two examples for their designs in sample. The functional design of the two types are similar with one exceptional difference. The reception space and kitchen service are linked in type(1A)directly with living space, which is separated from bed space with preliminary isolation space that consolidated the length of these spaces from living. While this isolation space moves in type (1B) in front of living space to separate it from the spatial of reception and kitchen instead of bed rooms that linked with it directly, with review of the sample to see occupation, we observe existence of clear difference in the rate of occupation numbers for each model where the rate of occupation numbers in first type are (7, 78 ) persons this number is reduced in second type to (6,21) persons, but where sample distribution, the Table 5. showed that the type (1A) big space with area (150$m^2$ )(% 72, 7) and the bigger ratio was in plot with width (7,5m ), (%52, 7 )from the sample of this type and the rest (%20) appeared in width (6m) while the sample (C1) did not appear these models, but come from the rest of the sample(%21,8 )in type (B2) and the other rest groups were not included except little singular states but the type (1B)is on contrary which recorded far from watching in sample (C3) which it has the bigger width among the sample models to the samples that have more length in their proportions with observing the weakness watching in sample (C1)which have the length proportions within sample. The two models (C, D)for the type (1) as shown in Fig. 8. that formed as table shown a singular states are not more than(4)states in total sample. The two states showed a strong watching for the main entry within functional design.

#### 4.1.2 . Type - 2

This type appears in (%25.3) for the total sample which included the kind that contained joint spaces l for reception and living followed by open design style, as shown in Table 5. %80 from the sample came main type, which depended on the existence of two entrances for the housing from outside (the existence of main entrance for housing or directly ).The first entrance is related with reception and common living rooms and the second entrance is related with the service space (kitchen).While the bed rooms and their services were distributed in length site separated with transition spaces, which were isolated from other parts of housing. This space may be enlarged to contain family food or sometimes guests, as shown in Fig. 9.This model of type, as the sample showed, appeared in all partial samples except the sample (C1) which is not contained this type completely, while the two other models for the type (type2) contained a limitation volume from the sample and included another organization solution, which is resulted in appearing the joint space for living and reception in the advanced housing, followed by kitchen space that appeared with more length gradually and directly or across preliminary space (sometimes is used as a food space ) while the bed space and their services at the end of the design, which can be reached from living space (type2B) or kitchen space (2C) and across a preliminary isolated space in two procedures. These models appeared in all samples except the sample (C1) too. the models of type 2 agreed to be open design style and the existence of joint spaces for reception and living as well as the additional length which provided by spatial organization in isolating the bed space, which compensated the relative little length for the models of this sample.

#### 4.1.3 Type - 4

The ratio of this type is (%7, 1)for the total sample as shown in Table 5. Although this kind included an independent space for reception, but the relation of this space with rest spaces is unimportant and isolated in the advanced housing and it is put in the high floor related with outside stairs, as shown in Fig. 10.The appearance of this spatial organization as additional option represented a picture of the insisting of the family to provide this isolated space for reception even with the circumstances that don't encourage on that specialty with tightened front. The

competition of this active as an independent space is appeared firstly in front of housing with the other actives to push the design to remove it to the front or to the high floor to take its advanced place without hindering the other spaces relations with outside.

#### 4.1.4 .*Type - 4*

This type included some singular states with ratio not more than (%1, 9)from the total sample, as shown in Table 5, which appeared in two functional types, both of them shared in containing a separate space l for reception that formed the total front of housing in away can pass from that space to the spatial depth into the housing. This type was not existed in the widen fronts (7, 5 )m but it often appeared in plots that have longer proportions. This view is supported by observing the diffusion of this type largely with the longer proportions of the residential plots and smaller area, therefore the models of this type in sample(C3) are not appeared because of the existence of enough width for many actives in front of housing, while its existence is increased with the effects of those two factor until similarly formed (%55, 6)from the sample (C1) as shown in Fig. 1.

### *4.2.The discussing special results of spatial organization for the survey sample of housings*

Discussing the results points to that the type (1) is the most popular within survey sample (%55,7) from the total sample ), which was similar to the characteristics of functional design of the bigger area housings especially in its model (1A)which represented the bigger sample with type (1) and the bigger partial sample within the whole types designs (% 34,8) followed by the model (1B)that its ratio came in second class among sample models (%20,9) from the total sample) which is similar to the first model with some slight changes in its partial details. This pointed out, regardless of these simple differences, that the resident adhere with the design as much as possible which dealt with the large plots before turning to the new forms of organization. The new changes are imposed on the area and proportions of residential plots. The justification of this conclusion could be explained during the concentrated diffusion of model (1A)among partial sample with the sample of more area and width of housing front (samples C3, C2, B2).these models are closer in their characteristics to the reliable limitations for partitioned plots in actual housing, while the type (1B)concentrated in partial sample which have a minimums areas and proportions (A1, B1, B2 ). The sample (C1) is freed from these models with one singular exceptional state. The two other types represented two pictures of modifications that the first type adapted with the effect s of changing the dimensions and the proportions of the new residential plot. The type (2) represented the most incidental modifications on housing type (1)towards the open type and incorporate the actives of reception and living within one space. The diffusion of the sample of this type in all partial samples (except the sample C1)and its relatively high existence ratio (%25,3)from the total sample showed the serious directions of the family for adaptation the spatial organization and incorporation the living space with facts changes of the residential plot while the third type pointed out another adaptation to keep on the reception space, get it out and isolate it from spatial relations of housing or high floor. The fourth type pointed out, although its limitations, the designing state observed by previous studies to adhere with reception active as a separated space even with more length and less front width samples. The occupation of this isolated space of tightened front of building resulted in transmitted it to circulation path inside housing and this disagreed with the application with both family specialty and the nature of using the space and then it is interpreted with sample s limitations which the functional organization was included. The Fig. 12, showed the types that were extracted from the analyzing the survey sample. The comparative pointed out some facts concerning the different types that the rates potential for occupation in housing which is amounted( 6, 54 persons/ housing ) for the sample publicly. As shown in Table 6, the occupation rates were distributed within two levels, first the high rates in type first and fourth which were related with types that depended on providing an independent space for reception which is related with the structure of spatial organization of housing, the second is the minimum rates for occupation rates in second and third type which were related with the minimum importance of reception space when it is related housing or when it is attached as outer or inside space with second floor and within a secondary binding from inside and outside.

### *4.3.The special conclusions of organization type and spatial depth in housing*

1.The sample showed incorporation processes in housing actives which depended on the design principle for open type with ratio (%30, 37) in comparison with the study of actual housing for large area which appeared the incorporation processes with ratio (%6,8).This type is spreading with reducing the area of residential plot and its front width.

2.The study showed variant states among the incorporation of housing space, which included incorporation of actives in one or two zones such as incorporation of (living active with reception) or (living with food). There is no space l included incorporation of three zones, which pointed to stop design processes solution of incorporation (for example the sample does not face any similar solutions for the models of bigger mixing for actives as studio model with housing with little occupation. The family realized the importance of social factor.

3.the study showed that many of main space could be voided in housing such as the spaces of( guests food, guests bath, guests entrance, the outer space ) as well as the secondary actives in housing such as voiding the active of family food from living or voiding the store from kitchen because of the littleness area of residential plot, but there are main space in housing could not be dispensable.

4.The results showed diversity in types of spatial organization of sample housing. According to the results, as shown in Table 7, the spread of these types was variant within main details of survey sample, because they were variant in their characteristics, The model (1A)was appeared in samples that have more area and front width while modified in model (1B)to concentrate in median extent far from the maximum and the minimum limitations for proportions, but the spread of model (2A)( with characteristics of open style of design )among different sample except (C1, C2)which were characterized in the existence of area with tighten front that imposed length proportions to disappear this model, while the two samples (3A, 3B)were motivated to appear in residential plots that have more length and more limitation in area and they have not effective existence in more width samples and more area (C2, C3). The variation in area details and the proportions of residential plot generated group of different detailed types instead of resorting to coercive subjection of the first type with the exceptional of some limited models of these types ( which were familiar in their existence in sample with the experiment potential and right, wrong and imitation by the designer, who may not be always specialized ).The sample showed similar types in their spatial depth levels which were variant definitely and justified with the differences among the residents about specialty degrees and their demands in housing ( entrance availability as a separated space )or separating the main zones or changing the characteristics of the type between open and closed organization of design.

5. Although the diversity in dimensions and proportions of residential plots but showing the details of sample type especially in main partial models pointed out closer in the values of spatial depth in them. Table 7, showed the important models and pointed to some stability with spatial depth organizations among sample details. The degree of spatial depth was ranged (starting from the entrance which it is considered the first level)between (5-4)levels for all length designs of the models of sample types, unlike what Al-Nueimi study showed. which pointed to the diversity of length design in housing sample in Mosul city with different proportions of residential plot. The sample provided more stability models of functional organization and spatial depth [2]

This stability came within two levels:

**1-On one type level in sample**: The stability could be explained with functional organization and the degree of spatial depth of housing with limited area and width of residential plot, which facilitated the appearance of some typed solution that were not variant but with tighten limitations.

**2-On the whole types levels of sample**: The relative stability could be interpreted with the level of spatial depth to many flexible functional types which were subtracted by the sample to give solutions for variations in area and front width of residential plots and to organize the spatial solution for designs in accordance with the required level of spatial l depth for all samples as subtracted above.

**5. The final conclusions of the research**

1- The economical limitations of residential plot within the limitations that the sample provided formed a main reason in creating many of spatial organization types such as, first the range for the public organization that expressed on housing with bigger area and new type which represented different views to organize the needs of user and according to the characteristics of the resident family. These organizations characterized different pictures of the relation nature among the zones of guests and living in housing, which was raised the specialty of organization for family that coordinated with the area and dimensions changing of residential plot.

2- All these types gave group of models which were correspondent in their main organization and variant in some of their partial details. the variation in appearance the types and their details among housing samples represented a

clear picture about the ability of actual housing to provide a new adaptation pictures of spatial organization, which were able to respond to the user needs within these ranges for area and front width.

3- The correspondent among spatial organization types and their many models with different samples of the area and front width became cleared in the ability of these organization to achieve closer value s for the spatial depth degree and distributed to the sample models in a way that respect the residents in achieving what is suitable to their social needs and be convenient for them.

4- The functional types that the sample provided showed many experimental solutions of spatial organization in their housings, which were variant among new organization solution and that which were adopted from spatial organization in large residential plots, while through the comparison of the results showed the test of explaining the success of these organizations and their ability on continuation and development contemporary housing production..

5- The recommendations:1- It is necessary to repeat such studies because the expansion in housing crisis very quickly and variation among urban areas in Iraq, which could give the details, beneficial, and variant results in their recommendations with the variation of social and economic specialty of residents among urban areas in Iraq. The independent application for these studies among different urban environments helps in sense with the most accurate variation among residents needs and directs the recommendations accurately foe each urban group particularly.

2-The repetition of this study must be not restricted to space variation but must be repeated in all times within the same urban environment because this repetition provides the best information to modify the trends of housing policy and its local resolutions in order to show more positives and negatives which were extracted continuously from housing production.

3-It is necessary to invest the results of the study to direct the legislations and laws that organized housing environment and raising sense level to its continued variation which help to achieve the highest aims of optimum of housing policy instead of being one of hindering appearances.

4 – The design ability variation which is raised by public sector in production of sample to provide the raised economical positives points to the necessity that the executive, engineering, and design authorities must contributed in promotion these results through providing the helpful model design from the official specialized staff to help in conscious direction of housing production in private sector.

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**Table 1** Shows the ratio of partitioned and not partitioned plots for the year 2013 [prepared by the researcher]

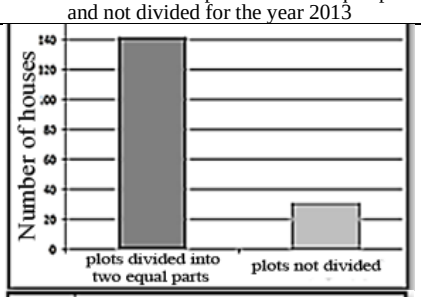
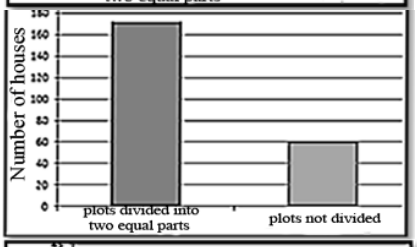
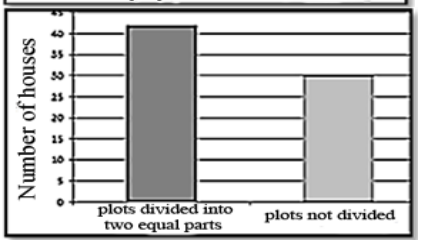
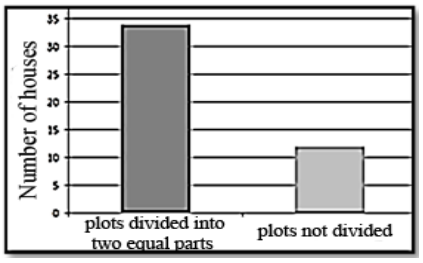
| The Quarters in Mosul City | | | | The ratio of the divided plots into two equal parts and not divided for the year 2013 |
|---|---|---|---|---|
| | | Plot Area $M^2$ | Front M | |
| Alkindi Quarter | plots not divided | 300 | 12 |  |
| | plots divided into two equal parts | 150 | 6 | |
| Asker Quarter | plots not divided | 300 | 12 |  |
| | plots divided into two equal parts | 150 | 6 | |
| Alhadbaa Quarter | plots not divided | 200-240 | 10-12 |  |
| | plots divided into two equal parts | 100 -120 | 5-6 | |
| Alrifaq quarter from the side alrawdah al muhamadiya | plots not divided | 300 | 12 |  |
| | plots divided into two equal parts | 150 | 7.5 | |
| Alrifaq quarter in front of alrawdah al muhamadiya | plots not divided | 300 | 12 |  |
| | plots divided into two equal parts | 150 | 7.5 | |

**Table 2**
standards of public housing association for the year 1982 [7]

| Structural density | The net residential density Person/ hectare | Ratio building from area plot | The minimum limit for returning | Width of plot | Area of plot | The singular housing type |
|---|---|---|---|---|---|---|
| 0.6 | 30-80 | %30 | 4m | 16-24m | 400-600m$^2$ | House with four cleavage aspects |
| 0.9 | 110-160 | %45 | 4m | 10-20m | 300-400m$^2$ | House with three cleavage aspects |
| 1.2 | 140-200 | %60 | 2.5m | 5-10m | 200-350m$^2$ | House with one or two cleavage aspects |
| 1.5 | 170-290 | %75 | 2.5m | 10-15m | 150-300m$^2$ | House with inner courtyard |

**Table 3**
the relation style among spaces within the four types (A, B, C, D ) in public housing design [prepared by the researcher ]

| Space site | Type D | Type C | Type B | Type A | Space |
|---|---|---|---|---|---|
| Front house | | | | | **Reception** |
| | | | | | **Living** |
| | | | | | **Food** |
| End house | | | | | **Kitchen** |
| | | | | | **Store** |
| | | | | | **Bed** |
| Private region | | | | | **Bath** |
| | | | | | **w. c** |
| | | | | | **Entrance** |
| | cancelled | | | | **Front garden** |
| | cancelled | cancelled | | | **Cars parking** |

**Table 4**

the ranges of area for the selected plots from quarters of Mosul City[prepared by the researcher ]

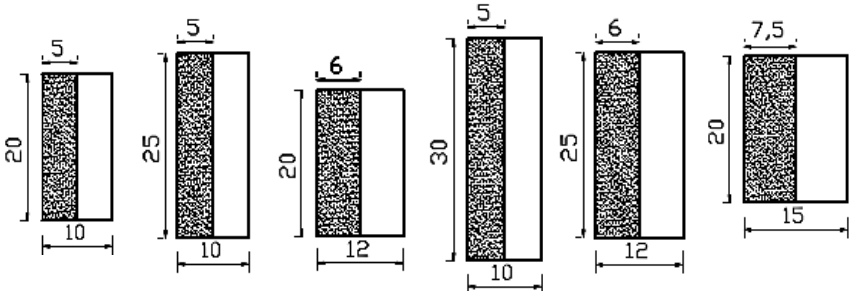
| 115< | 135- 115 | | > 135 | | | ranges of area for selected plots |
|---|---|---|---|---|---|---|
| **A1** | **B1** | **B2** | **C1** | **C2** | **C3** | **Detailed classifications of sample** |
| **25** | **22** | **25** | **9** | **35** | **42** | **The models number of the detailed sample** |
| **<5.5** | **<5.5** | **5.5-6.5** | **<5.5** | **5.5-6.5** | **= OR>6.5** | **The range of width front** |
| Alhadbaa | Albaladyat | Alhadbaa Albaladyat | Almaliya | Alkindi Alsukar | The Second Alkafaat Alrifaq | **The selected quarters for survey** |
|  | | | | | | **The routine dimensions of the plots of selected quarter** |
| **4** | **5** | **3.334** | **6** | **4.167** | **2.667** | **The plot proportions Length/width** |

**Table (5)**

the classification of types in total and partial sample of the survey sample [ prepared by the researcher ]

| For model within total sample % | For model withinm type sample % | From the type survey among different models % | | | | | | Models of type | Ratio in total sample | Number in total sample | Kind of type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A1 | B1 | B2 | C1 | C2 | C3 | | | | |
| 34.8% | 62.5% | 2.3 | 1.1 | 13.6 | - | 12.5 | 33 | 1-A | 55.7 % | 88 | Type 1 |
| 20.9% | 33% | 4.5 | 6.8 | 5.7 | 1.1 | 12.5 | 2.3 | 1-B | | | |
| 1.9% | 3.4% | 1.1 | - | - | 1.1 | 1.1 | - | 1-C | | | |
| 0.6% | 1.1% | - | - | - | - | - | 1.1 | 1-D | | | |
| 20.8% | 80% | 22.5 | 12.5 | 10 | - | 12.5 | 22.5 | 2-A | 25.3% | 40 | Type 2 |
| 3.8% | 15% | 5 | 2.5 | 2.5 | - | 2.5 | 2.5 | 2-B | | | |
| 1.3% | 5% | - | - | 2.5 | - | 2.5 | - | 2-C | | | |
| 2.5% | 14.9% | - | 3.7 | - | 7.4 | 3.7 | - | 3-A | 17.1% | 27 | Type 3 |
| 5.7% | 33.3% | 14.8 | 11.1 | - | 7.4 | - | - | 3-B | | | |
| 5.7% | 33.3% | 7.4 | 11.1 | 7.4 | 3.7 | 3.7 | - | 3-C | | | |
| 3.2% | 18.5% | 3.7 | 7.4 | - | - | 7.4 | - | 3-D | | | |
| 1.3% | 66.7% | - | - | - | 66.7 | - | - | 4-A | 1.9% | 3 | Type 4 |
| 0.6% | 33.3% | - | - | - | - | 33.3 | - | 4-B | | | |

**Table 6**
the comparison of different types in sample with the occupation in housing[ prepared of the researher]

| Total sample | Type 4 | Type 3 | Type 2 | Type 1 | The sample |
|---|---|---|---|---|---|
| 6.54 | 7 | 4.89 | 5.78 | 7.38 | **Rate of occupation person /house** |
| 136.1 | 161.3 | 130.4 | 130 | 139.8 | **The rate of plot area** |

**Table 7**
rates of spatial depth degree of the partial sample for types according to the results of survey sample [prepared of the researher]

| The highest appearance ratio within the details of survey sample | | | | | | The kind of partial samples for types | The degree rate of spatial depth |
|---|---|---|---|---|---|---|---|
| **A1** | **B1** | **B2** | **C1** | **C2** | **C3** | | |
| | | | | | | 5 | 1A |
| | | | | | | 5 | 1B |
| | | | | | | 4 | 2A |
| | | | | | | 5 | 3B |
| | | | | | | 4 | 3C |

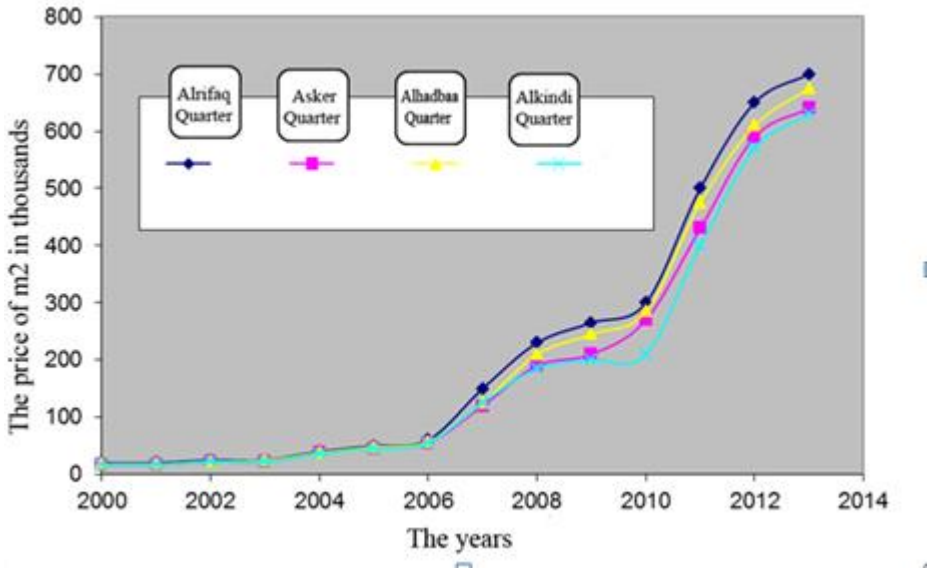



**Fig. 1.** the increasing in prices of plots in Mosul City
[ prepared by the researcher]

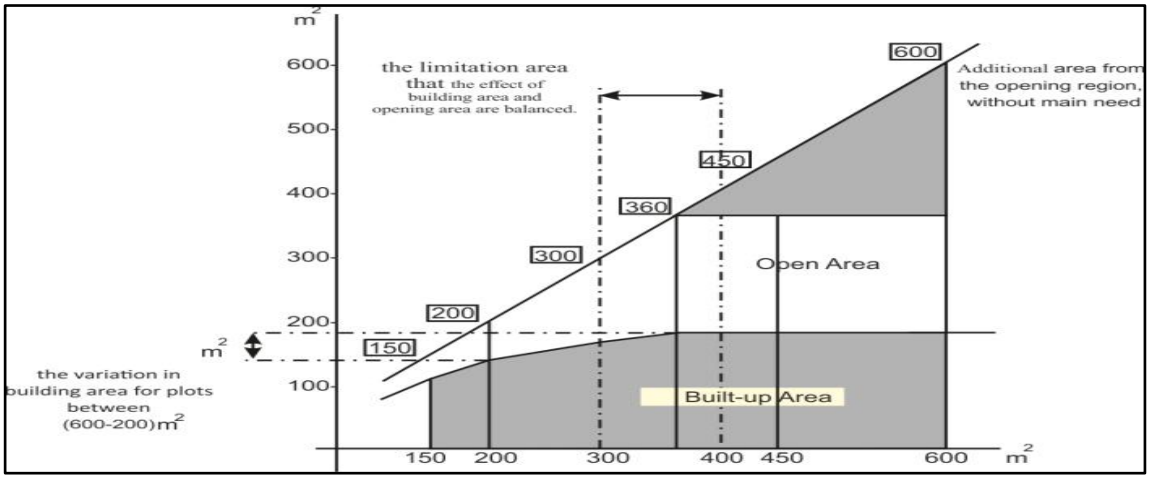
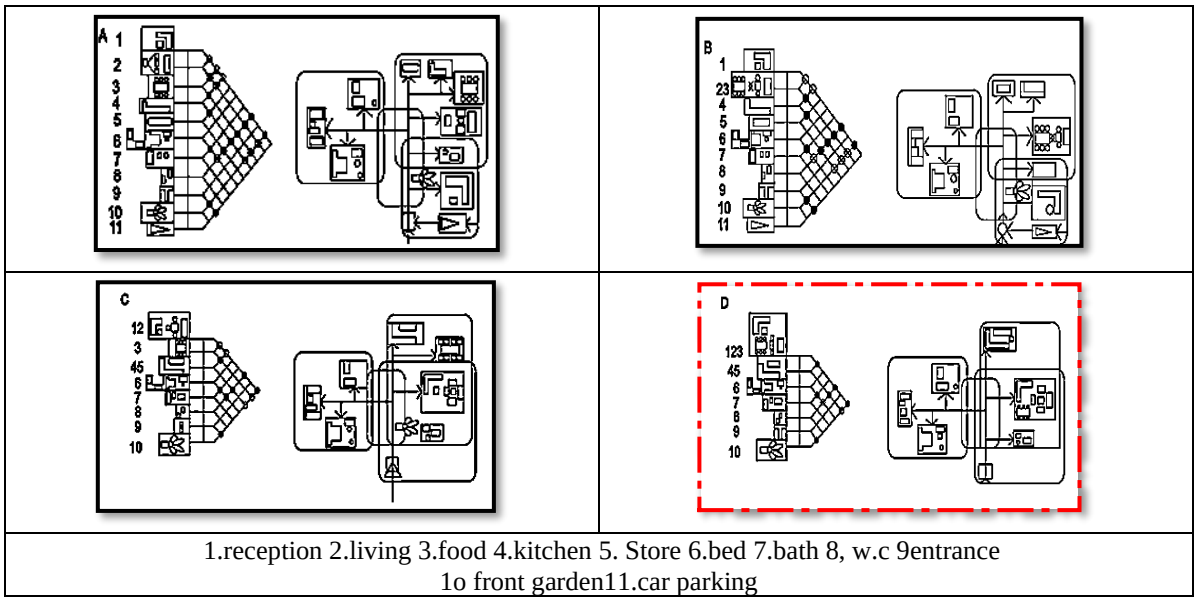



**Fig. 2.** the change relation among the residential plots areas and the built-up area in it [4]




1.reception 2.living 3.food 4.kitchen 5. Store 6.bed 7.bath 8, w.c 9entrance
1o front garden11.car parking

**Fig. 3.** the plannings of main functional relation (A, B, C, D, )for suggested housings in public housing planning in iraq [10]

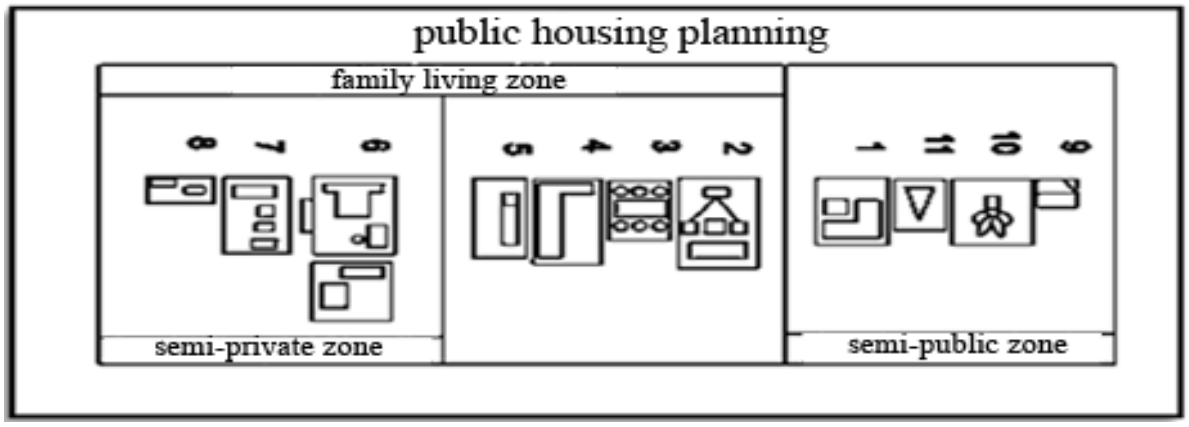



**Fig. 4.** the distribution of zones in housing according to the study of public housing [10]

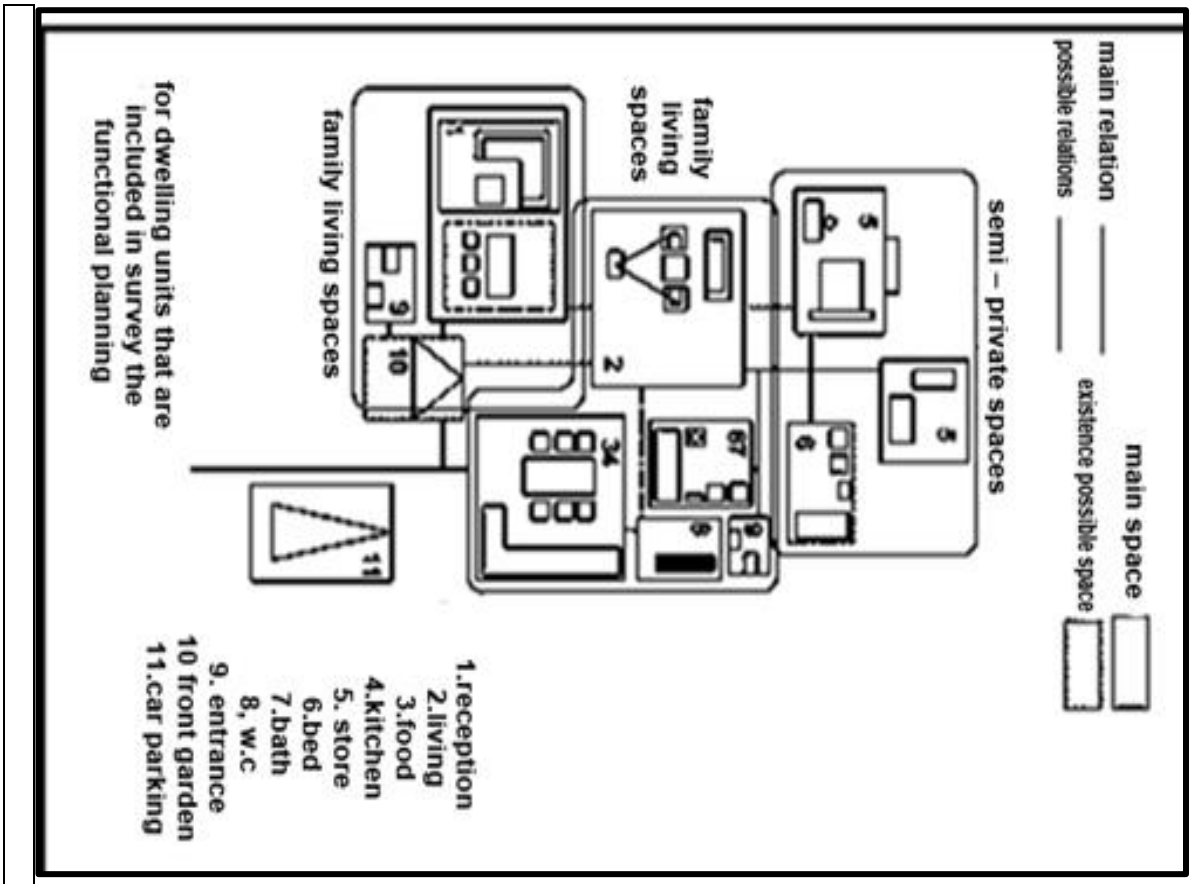



**Fig. 5.** the distribution of zones in housing according to the al- sanjary study [10]

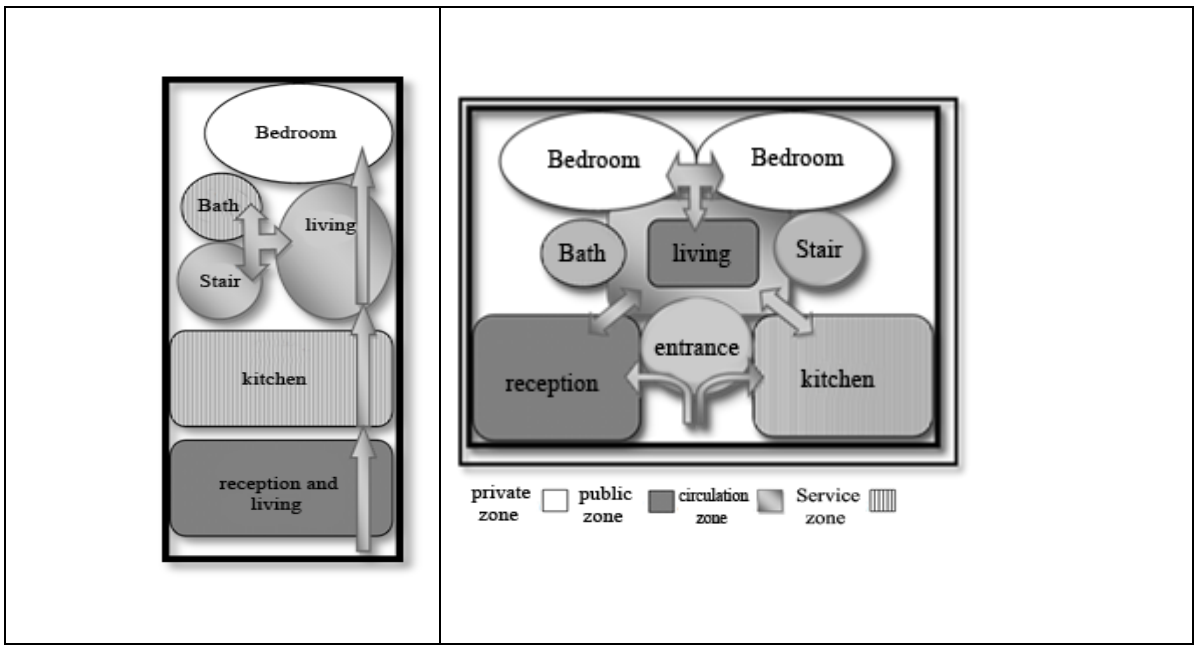
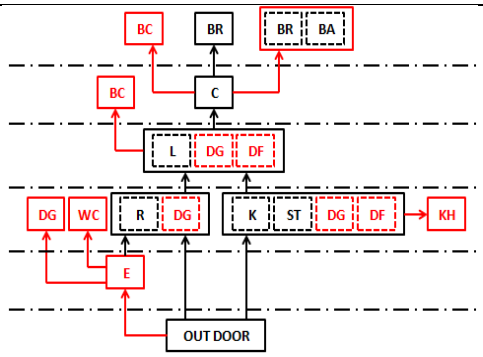



**Fig. 6.** spatial Organization for Contemporary housing [11]

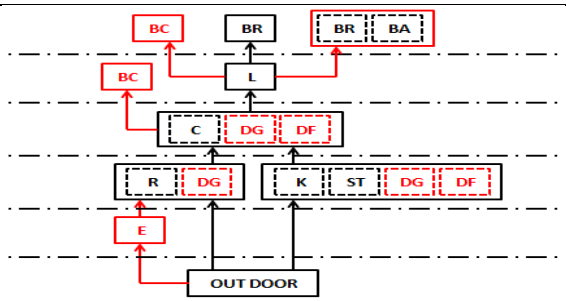
Model of sample

(TYPE 1) (1-A)




Model of sample

(TYPE 1) (1-B)



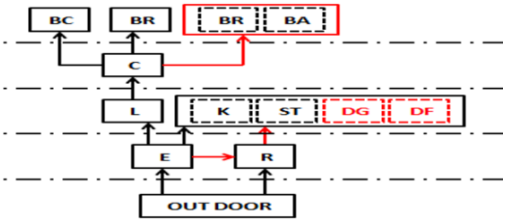

| | |
|---|---|
| | active permanent existence |
| | existence possible space |
| | existence possible active |
| | existence possible space |
| → | relation permanent |
| → | possible relation |

| KEY | | | | | |
|---|---|---|---|---|---|
| | | DG | Dining Family | C | corridor |
| | | DF | Dining guests | BC | bath + WC |
| E | entrance | K | kitchen | WC | toilet |
| R | reception | KH | Hot kitchen | BA | bath |
| L | living | ST | store | BR | bedroom |

**Fig. 7.** the two models (A, B)of the type (1)[ prepared by the researcher]

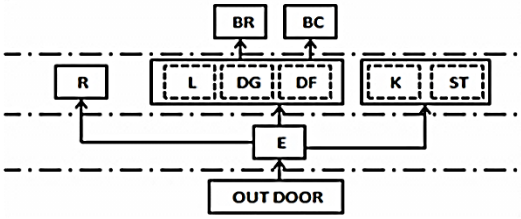
Model of sample

(TYPE 1) (1-C)




Model of sample

(TYPE 1) ( 1-D )




| | |
|---|---|
| | active permanent existence |
| | existence possible space |
| | existence possible active |
| | existence possible space |
| → | relation permanent |
| → | possible relation |

| KEY | | | | | |
|---|---|---|---|---|---|
| | | DG | Dining Family | C | corridor |
| | | DF | Dining guests | BC | bath + WC |
| E | entrance | K | kitchen | WC | toilet |
| R | reception | KH | Hot kitchen | BA | bath |
| L | living | ST | store | BR | bedroom |

**Fig. 8.** the two models (C, D)of the type (1)[ prepared by the researcher]

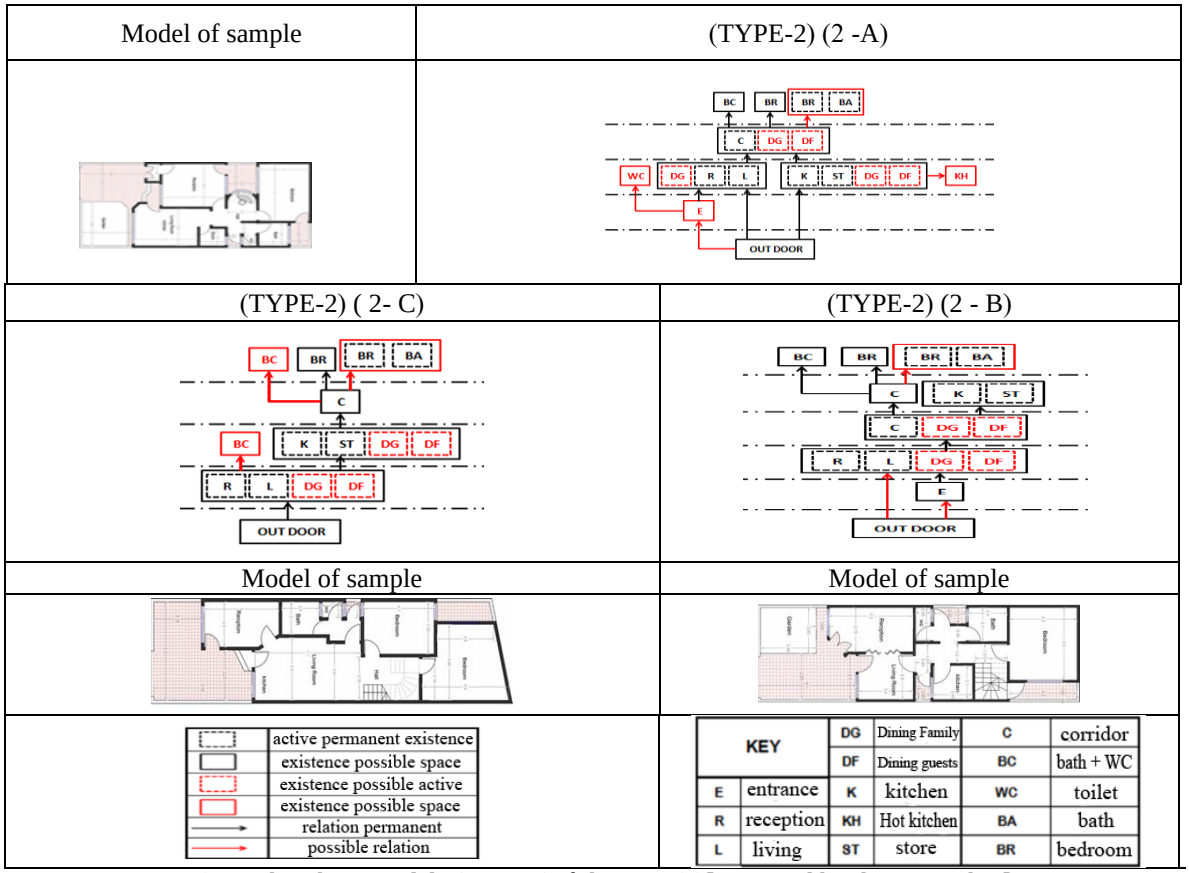



**Fig. 9**. the Three models (A, B, C)of the type (2)[ prepared by the researcher]

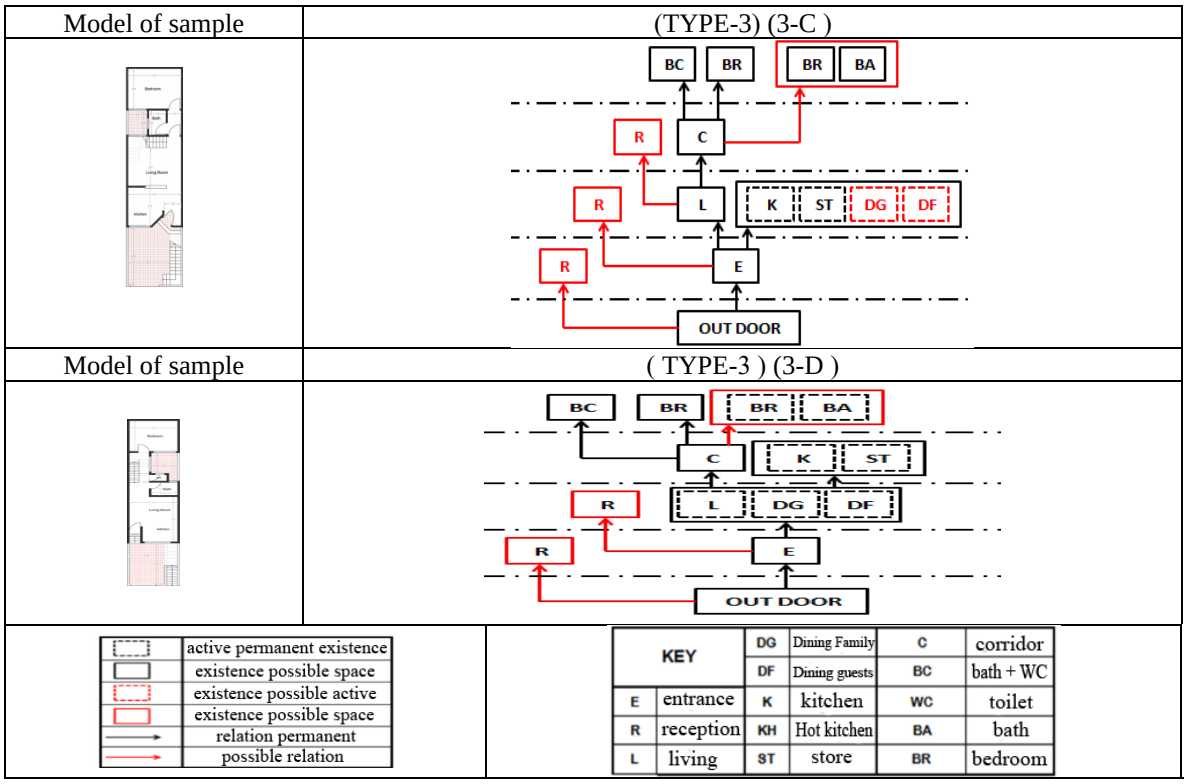
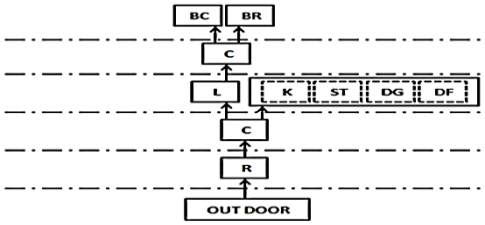
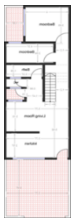
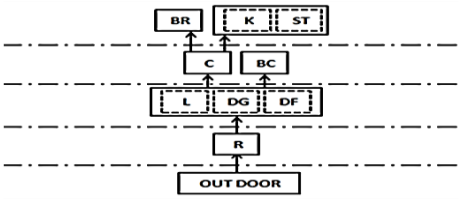
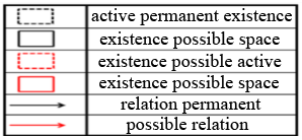



**Fig. 10.**the two models (C, D)of the type (3)[ prepared by the researcher]

| Model of sample | (TYPE- 4) (4 -A ) |
|---|---|
|  |   |
| Model of sample | ( TYPE-4) (4-B) |
|  |   |



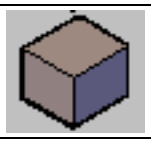

| KEY | | DG | Dining Family | C | corridor |
|---|---|---|---|---|---|
| | | DF | Dining guests | BC | bath + WC |
| E | entrance | K | kitchen | WC | toilet |
| R | reception | KH | Hot kitchen | BA | bath |
| L | living | ST | store | BR | bedroom |

**Fig. 11**.the two models (A, B)of the type (4)[ prepared by the researcher]

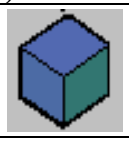
| | |
|---|---|
|  |  |
| (TYPE 2 ) | (TYPE 1) |

(TYPE 4)

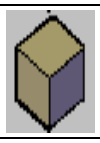
(TYPE 3)



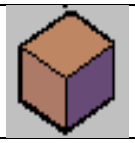
Reception and living



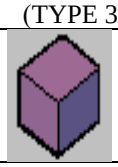
Reception



living



Kitchen



Bed room

Key

**Fig . 12.** shows the functional types that are abstracted from the survey sample
[ prepared by the researcher]