A TAXONOMY OF TYPOLOGICAL CLASSIFICATIONS

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The 'Building Types Online' database offers academic and professional users a flexible, customizable access to currently more than 1000 building case studies. The tool to integrate these curated precedents within one knowledge base, to synchronize and complement all contents within a coherent system that covers all essential aspects for the comparative analysis of buildings is an overarching typological classification system that the editors of this database have developed and established. This article aims to define and explain the various terms of this multi-thematic and -scalar taxonomy.

In discussing 'Designerly Ways of Knowing', Nigel Cross (Cross, N., 1982) argues that a significant part of architectural knowledge is embedded in precedents, that they are something that designers can learn from - by conducting a process of matching, classifying and comparing, as an act of 'scanning a scene' to translate back from the final object to abstract requirements. Lawson (Lawson, B., 2004) argues that studying precedents helps designers to develop "schemata that enable them to recognise underlying structures in design situations". The taxonomy introduced here intends to give these processes of classifying, comparing, scanning and translating such 'schemata'.

Many of the precedents included in the 'Building Types Online' database have been selected earlier for the publications listed under 'Birkhäuser Authors and Publications'. The original typological taxonomy of these publications has whenever possible been taken into account by means of comparative case study analysis. However, the usability of such taxonomy goes beyond in a database where such choice of compilation on precedents is entirely volatile and adaptable, and able to follow hybrid, individually settable criteria.

Flemming and Aygen (Flemming, U., Aygen Z., 2001) maintain that compiling precedents in a database has the advantage to "separate the precedent instances from the concepts they embody". Concepts - as the aspects and criteria that can be studied and searched for - "are defined in terms of multiple classification taxonomies". Thus, the individual research process is not necessarily focusing on the precedent as such, but can rather be driven by an explicit interest in specific aspects, by means of comparative studies across many projects falling into the same category. Both components – the taxonomy and the precedents – can also grow and change: The taxonomy can be extended or modified to include aspects that might be considered relevant in the future. The database can also be "populated" with more precedents, with the potentiality that new "typological series" (Flemming, U., Aygen Z., 2001) might evolve.

Specifically designed for the 'Search' and 'Browse' structure of an online typological database, the taxonomy establishes a user interface that allows its users to conduct a customized, comprehensive search by individually specified criteria to identify relevant projects. They can then study the search results also by means of comparison with other projects that have similar characteristics.

The level of specificity of the various terms is to a certain extent quite diverse – some are explicit like the number of levels or the load-bearing system, some are based on a comparison that concludes that one aspect is more relevant than the other. Some projects can easily be labelled and identified while to others multiple classifications have been attributed in order to circumscribe their rather ambiguous aspects lest they be too narrowly defined. Thus, for instance, the urban context of a project can be 'Modernist Urban Fabric' and 'Campus' at the same time.

'Building Type', 'Urban Context' and 'Morphological Type' are the three main conceptual options for accessing the complete content of the 'Building Types Online' Database according to function ('Building Type'), urban setting ('Urban Context') or the morphological form of the building ('Morphological Type').

While 'Urban Context' and 'Morphological Type' focus on aspects relevant to the building at its urban scale, 'Geometric Organization', 'Height', 'Load-Bearing Structure' and 'Access Type' are based on the make-up of a building itself. These categories are intentionally broad and whenever possible universal in order to allow comparative analyses of all case studies across all 'Building Types'.

In addition, the classifications of 'Floor Plan Layout' and 'Program' focus on the specific functional 'Building types'. For residential buildings, 'Operational Form' provides an additional aspect to aid further analysis.

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URBAN CONTEXT
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As a rule, the term 'Urban Context' does not refer to specific geographic locations but to the morphological structure of the building's immediate physical context. It is also used for contexts outside of cities, such as 'remote/rural'. In cases where projects are situated at the intersection of several types of urban contexts or in rather unspecific surroundings, more than one category has been assigned.

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Urban Block Structure
Urban blocks are predominantly rectangular sites embedded in grid-like patterns of streets that expand over large, most often inner-city urban areas. Series of buildings aligned along their perimeters formulate the 'urban blocks', defining urban spaces such as streets or squares on the public side and courtyards on the private side. In European cities, the closed block edge remains the dominant form, but urban blocks in other parts of the world can also be occupied with buildings offset from one another. The focus is less on the individual buildings within the block but more on urban spaces like streets and squares formed by them.

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Central Business District/City Center

The 'Central Business District' is often synonymous with the city's financial district and tends to be a mono-functional island with mainly commercial and business functions. Due to its often central, representative and well-connected location in a constrained area, the 'Central Business District' is in most cases significantly denser than the encompassing areas and is as a result often occupied by high-rise buildings.

'City Centers' or 'Historical Centers' are primarily central urban areas that have evolved over time – with traces of old road networks and low to mid-rise heritage buildings often with mixed functions. The two classifications have been grouped together as they often locally coincide.

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Modernist Urban Fabric
The 'Modernist Urban Fabric' as an urban type was developed as an alternative to the traditional urban block, with the promise of maximizing exposure to 'sun, light and air' in open, green districts. This type of urban context is often occupied by customized and replicated, freestanding morphological types such as 'Slab' or 'High-Rise' arranged as urban ensembles. On an urban scale, such settings can be mono-functional, spatially segregated islands as large-scale developments such as satellite cities and New Towns.

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Suburbia
Suburban settlements, sometimes following the model of a 'Garden City', are predominantly residential communities within commuting distance from an urban center, either as part of a city itself or as a separate municipality. Suburbs are for the most part purely residential, homogenous areas predominantly occupied with low-rise morphological types such as the 'Detached House' or 'Row

House', often with their own yards. Consequently, this urban context is significantly less dense than inner city neighborhoods.

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Peri-Urban Region/Urban Interstices
Such areas – in comparison to other urban contexts – often have no specific formal features or urban character. Their spatial characteristics are predominantly determined by their proximity to infrastructural zones such as interchange nodes or transit areas with interregional highways or railways. Sometimes, such as in the case of former urban harbours or other abandoned, often centrally located areas, the spatial structures can be remnants of original purposes for goods production or transportation, that have become obsolete. Strategies for the urban revitalization of these areas often aim to adapt to distinct forms of urban context types and for seamless connectivity with the encompassing urban fabric. In areas like urban peripheries they emerge as rather fragmented, dispersed urban hybrids, with mixed urbanities and densities, uses and building types. Tom Sieverts (Sieverts, 2003) coined the term 'In-Between Cities', as they are neither part of an old downtown nor a new suburb, are often spread across different administrative entities and grow in a less organized way than the other types. Instead of adapting to surrounding typologies, buildings in these areas are often autonomous objects or ensembles.

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Village/Town
Both village and town have typically evolved as independent settlements, with layouts most often based on an organically developed network of streets. Being predominantly low-rise, with detached buildings and functionally mixed settings, the morphological and functional structures of their center and periphery cannot always be clearly differentiated.
While the village can be a small community or even a group of houses in a rural area, the town is larger, more densely populated and may even be comprised of neighborhoods with a suburban character.

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Remote/Rural
Buildings situated in 'Remote' or 'Rural' areas are set apart – visually, spatially or both – from other buildings or settlements, and consequently do not have to respond to the contextual constraints of a built environment. They most often appear as autonomous objects, with their own intrinsic relations to the landscape.

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Campus
A 'Campus' is an area specifically conceived for and operated by predominantly educational or research institutions or large hospitals, and often combines a range of programs to form a coherent setting or building ensemble. Their layouts are not bound to specific urban patterns and can be based on types such as the 'Urban Block', 'Green Spaces/Parks', the 'Modernist Urban Fabric' and so on. They can be either designed as islands or embedded within the existing morphological forms of their surroundings.

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Industrial Area/Business Park
'Industrial Areas' or 'Business Parks' are primarily mono-functional zones that have been exclusively planned for either productive (blue-collar) or administrative (white-collar) functions. Often situated in 'Suburban' or 'Peri-Urban' areas, proximity to traffic infrastructure is often a main prerequisite. Their layouts are not bound to specific types of urban patterns and can be based on types such as the 'Urban Block', the 'Modernist Urban Fabric' or others.

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Museum District
Often set in central areas, several museum buildings are combined as one urban ensemble to create prominent representations of civic culture. Not following a particular urban pattern their layouts can be based on morphological types such as the 'Urban Block', the 'Modernist Urban Fabric' and so on, or they can be integrated into urban green spaces.

....
Green Spaces/Parks
Projects based in 'Green Spaces' or 'Parks' in inner city locations or in more suburban settings are predominantly places for civic recreation. The configurations of buildings in such contexts are often either distinctively shaped by landscape features — such as topography or greenery — or are designed as autonomous, freestanding, solitary forms.

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MORPHOLOGICAL TYPE
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While in the context of this database, the term 'Building Type' refers entirely to the use and function of a building, the term 'Morphological Type' is used here to exclusively describe the physical configuration as morphological form of the building.

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Block Infill/Block Edge
Both 'Block Infill' and 'Block Edge' are common morphological types within an 'Urban Block'. The urban context and morphological building type within often evolve mutually – with configuration, orientation, height, depth, courtyard size, overall density and other parameters as embedded, sometimes tacit rules. While a 'Block Infill' building occupies a remaining gap in the block, the term 'Block Edge' refers to buildings that define formerly undefined block edges, a quality that is often used for the creation of larger developments. While such buildings predominantly form seamless lines along the block's perimeter, individual volumes may also be detached and offset in open compositions. Corner buildings, with the disadvantage of the poorly lit inside corner, and firewall buildings, with the constraint of their one-sided orientation, demand more specific solutions.

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Entire Block
Following similar patterns like 'Block Infill' and 'Block Edge', the 'Entire Block' occupies one or even several urban blocks in their entirety, sometimes assuming the character of a large 'Solitary Building'.

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Solitary Building
'Solitary Buildings' are designed to appear as autonomous, freestanding objects with facades of predominantly similar importance on all sides often intended to have a significant impact on the surrounding space, for example as an urban landmark. They can also be part of an ensemble of solitaires with a more or less stringent canon of regulations. Various morphological types are possible, such as a 'Big Box', 'Solid Block', 'Urban Villa', 'Courtyard House' or 'Atrium House', the latter using its center as a shared space or for daylighting. Circulation or other servant spaces like toilets or storage rooms are often organized within the building core, such that the facades can take on other, more prominent spaces with ideally similar window formats.

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Slab/Super-Block
The 'Slab' was originally a crucial modernist morphological building type developed for 'Modernist Urban Fabrics' with their open green urban spaces to offer its occupants sufficient 'sun, light and air'. The floor plan layouts combine predominantly similar units to form a linear configuration. While the ground level can remain open or accommodate auxiliary or public functions, the other levels are often vertically replicated as typical standard floor plans. Slabs can also be combined to form comb structures and other ensembles.
The 'Superblock' is larger in scale and usually deeper, its spatial hierarchy consequently more complex. Rather than vertically and horizontally repeating layouts, it combines different access systems, mixed programs on upper levels and various unit types.

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High-Rise
The 'High-Rise' building is in principle a fundamentally urban building type, one which allows for a significantly higher ratio of area utilization. Its historical origins lie in processes of rapid urban densification, but also in technological advancements such as skeleton construction techniques and the development of safety features for passenger elevators. The 'High-Rise' building often follows a

'law of the series', stacking the highest possible number of identical or similar floor plans on top of each other. In most cases, spaces are grouped around a central access core, often oriented toward one side only. Beyond its definition by physical height, the term 'High-Rise' is also specified in building codes: floor levels beyond the height reachable by fire department vehicles often require dual fire escape routes and other specific fire protection measurements.

Complex/Ensemble

'Complex' and 'Ensemble' are combinations of a number of buildings (or building wings) within a single development – often as a composition of more or less similar morphological types arranged around common open spaces with shared facilities. Complexes can evolve over time, with the addition of new volumes or extensions of existing buildings to meet changing demands. Both 'Complex' and 'Ensemble' often establish clear boundaries toward their environment and can – by virtue of their scale – contribute to the development of larger urban districts.

Clustered Low-Rise/Mat

This type describes a conglomerate of building volumes and components that are clustered to generate repetitive, pattern-like configurations seemingly able to expand in all directions (i.e. in width, depth and height). "Low Rise – High Density" is a widespread paradigm, as density cannot only be achieved by height but also through a minimization of uncovered site area. Various formations are possible, including back-to-back configurations, patchwork developments with embedded courtyards or multi-story conglomerates with stacked and interlaced unit components. Additional daylight has to be introduced through courtyards, patios or skylights, which can become essential spatial features.

Row House

'Row Houses', sometimes also called 'Terraced Houses', are linear series of building units as repetitions of one or various types, connected to form a row. The classic type is rather deep but narrow, laid out between two long party walls and often two levels high. 'Row Houses' often have a small buffer zone at their street side and a more generous private garden in the back.

Detached Building

The 'Detached Building' is defined as freestanding and usually significantly smaller in scale than all other types, often only accommodating one unit. They are predominantly found in suburban, village or town contexts, and are often embedded in settings with many other detached buildings similar in scale and appearance.

Stepped Building

'Stepped Buildings' are defined by the fact that most of their levels are terraced, that is set back from one floor to the next floor. The ensuing configuration with a continuously stepped sequence of roof terraces as extensions of the unit interiors is its defining feature. 'Stepped Buildings' can be located either on natural slopes oriented in one direction or generate an artificial topography themselves, with areas requiring little or no natural light located in their deep core areas, such as access zones, storage areas, parking garages or even expressway tunnels.

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GEOMETRIC ORGANIZATION
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To a certain extent premised on Francis D. Ching's definitions of formal and spatial organization – 'Geometric Organization' describe in a rather abstract manner the geometric organization of a single building, or the geometric order according to which several building segments of an ensemble relate to and combine with one another to form an overall and coherent configuration.

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Centralized
The building parts are arranged around a geometrically regular, centrally located dominant spatial feature. This can be a central element or interior space, a courtyard or an atrium, which constitutes an important hierarchical element in the spatial order and organization of the building.

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Linear
A 'Linear' configuration – as a continuous extent of length in one dominant direction – can be a singular linear form or a series of segmented forms arranged in a line or attached to it as appendices. This type also covers volumes that are curvilinear, parallel to one another or bent to enclose a space.

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Radial
A 'Radial' configuration consists of building parts or floor plan segments oriented toward one or several central reference points, at times expanding outwards from a common middle in a radiating manner. The center and its peripheral elements can be independent spaces or volumes, but they can also merge into a single form.

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Cluster
A 'Cluster' describes a spatial combination of various volumes, modules or elements with generally similar properties to a consistently composed, two- or three-dimensional conglomerate that follows a specific formative pattern often neither hierarchical nor centralized in nature. Void spaces set in-between are an integral component. The perimeters of such configurations follow a logic similar to the entire pattern.

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Grid
The 'Grid' defines an immaterial geometric order,
predominantly composed of rectilinear segments. It is often applied as an organiational principle for layouts that expand equidistantly in two directions. Grids can be used to either generate a dominant, sometimes symmetrical spatial order or simply to organize module-based structural systems with column-slab elements, often with open or flexible floor plan layouts in mind.

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Complex Geometries
'Complex Geometries' typically make no formal reference to basic geometric forms or morphological types. Their formative strategies often exemplify rather dynamic or conceptual themes, such as movement and light, user experiences or programmatic organizations. Spatial formations can emerge as the result of a sequence of geometric operations such as folding, dissecting, rotating or interlacing, among others.
Parametric CAD applications help to facilitate design processes that are based on the use
of parameters as editable variables also for the generation of such architectural forms.

HEIGHT

For the categorization according to 'Height', only full levels above ground are counted. Technical or mechanical blocks on the roof level are for the most part excluded. The term 'High-Rise' has been applied to buildings with eight or more stories, since in many countries buildings are legally considered 'High-Rises' from this level upwards due to issues of accessibility by fire department vehicles and the requirements of dual fire escape routes and other fire protection measures.

LOAD-BEARING STRUCTURE

Solid Construction
Space-enclosing elements, such as walls and floors, are integral parts of the load-bearing structure.

Column-and-Slab
A filigree structure in which load-bearing and space-enclosing elements are separated, consisting of linear elements, such as columns and slabs, and often used to allow flexibility.

Wide-Span Structures
In instances where spatial dimensions exceed those easily spanned by 'Solid Construction' or 'Column-and-Slab' systems, wide-spanning systems such as tensile or truss structures are implemented.

ACCESS TYPE

The different 'Access Types' categories refer to the access to the individual 'units' within a building - such as to apartments, offices, classrooms, etc. The layout of access spaces can be understood as an important organizational feature that often determines the entire spatial hierarchy of a building.

Street Access
The individual units are accessed directly from the public street level, in some cases with an intermediate space or change of level in between.

Courtyard Access
The individual units are accessed directly from open spaces on the private lot, mostly from courtyards enclosed by buildings or other vertical barriers. Included here are examples with units that are also accessed from forecourts or more generally from somewhere on the premises of a larger site.

Vertical Core
The entrances to the individual units are connected to a vertical circulation core comprising communal staircases and/or elevators.

Corridor
The individual units are arranged along both sides of a horizontal, interior circulation space, most often set parallel to the facade.

Gallery/Street in the Air
The individual units are accessed from a gallery – a horizontal and often open circulation space, projecting from the outside of the building and connecting one or several vertical circulation cores typically situated at the building's ends.

Atrium/Hall
The individual units are accessed via a covered, sky-lit space most often extending over multiple levels. In many cases vertical circulation cores and galleries are arranged around this void space.

Comb/Grid Systems
In deeper buildings or larger complexes with parallel and lateral building wings, the individual units are accessed through horizontal circulation systems that branch off in more than one direction.

FLOOR PLAN LAYOUT

The types of 'floor plan layout' describe how design concepts for the arrangement of the program with its various components – driven by functional, experiential or social concerns, by contextual constraints or other aspects – affect the spatial organization and consequently the entire building. Most terms focus on the organization of the plan, even though also the sectional organization has been considered, sometimes by using different terms for the various levels.
Whenever possible the taxonomy draws on the terms used by the original case study authors. Comparative studies across various precedents in regard to the layout have been used to identify generic patterns applicable across different building types. A consistent terminology appeared to be appropriate in regard to public buildings such as libraries, hospitals and museums, with the focus being in most cases on the public spaces. For some building types though (housing, office buildings, industrial buildings and sacred buildings) a more specific terminology has been included.

HOUSING: APARTMENT LAYOUT

This classification is devised as an instrument to understand the internal organization and arrangement of rooms within individual apartment units. In cases where the individual units lie at the interface between categories, several have been assigned to better describe the layout. In a few ambiguous cases, like when in a residential nursing home, a number of single-room apartments with en-suite bathrooms and sometimes kitchenettes are combined to form a larger communal unit with shared spaces, the terminology has been applied beyond the boundary of an individual unit.

Corridor/Hallway
Rooms are arranged in a sequence on one or both sides of a linear circulation space. The layout is instantly recognizable and allows simultaneous and flexible access to rooms without compromising more private spaces. Hallways provide access to rooms on all sides and can also be used as a representational space to welcome visitors.

Zoning
Spatial zoning predominantly separates the common living area with living room, kitchen and dining space, from the bedroom area with individual rooms and bathroom – often with a separate corridor in each zone. The kitchen, potentially in combination with a bathroom, toilet or storage space can be used as an 'Inserted Core' to divide the zones. 'Zoning' is often also applied in connection with horizontal access systems such as 'Gallery/Street in the Air' or 'Corridor', using the kitchen and bathrooms either as a buffer zone between public circulation and private apartment spaces, or for dark areas without any direct daylight.

Inserted Core

The positioning of one or several cores inserted in the apartment organizes the entire floor plan. The core can accommodate fixed programs such as bathrooms that do not require daylight. This type of layout leaves the other spaces potentially open to user appropriation and can be quite similar to 'Open Plan' layouts.

Living Room as Circulation Center

The living room is utilized here both as a common room to gather and as the intersection of all circulation routes within the apartment. This layout is conducive to communication but can limit the individual's urge for privacy.

Circular Path

The 'Circular Path' layout, with a continuous route passing through or along most of the spaces, turns the movement through an apartment into a spatial theme. It prioritizes social connectivity over the separation of residents. Such layouts can allow a certain degree of flexibility as rooms consequently often have more than one entrance.

Open Plan

Open sequences of spatial zones reduce spatial boundaries within an apartment to a few walls. Divisions are positioned with great care, functional zones are, if possible, not separated from circulation areas and always relate to the entire space. 'Open Plan' layouts can also expand across various interconnected levels.

Flexible Plan

Flexibility can be defined as the possibility of the conversion, extension or adaptation of an existing space to accommodate changing user requirements, either short term (i.e. day to night use) or long term. This can be achieved with additional, modifiable and movable elements or by enabling expansion and contraction of the unit. If elements of the load-bearing system and technical installations are strategically placed, flexible layouts can also enable self-build activities (see 'Self-Construction/Incremental').

Neutral Plan/Polyvalent Plan

'Neutral Plan' layouts are fixed – but the sizes and proportions of individual rooms, their positioning and access to the circulation zones or adjacent rooms do not determine a specific use. Such layouts are also called 'polyvalent' since they can be interpreted or appropriated as the resident sees fit.

Duplex/Triplex

The apartment unit spans over several full floors, with stairs and multi-level void spaces often being important spatial features. This layout often facilitates a vertical spatial separation of common and private rooms. It can be combined with different layout types on each level, such as 'Open Plan' on a more public and 'Corridor/Hallway' on a more private level. In multi-story housing, this type is often found in combination with corridor or gallery circulation, with the entrance usually located on the common room level and the kitchen and bathroom serving as a buffer zone.

Split-Level

The apartment spaces are distributed over three or more, often five or six levels, staggered in predominantly half-level increments. The connecting short stairs are most often centrally located and the landings merge into the floor levels. Visual transparency is at play, with a constant upward progression of common rooms transitioning seamlessly from the entrance and the kitchen to the dining and the living areas. Split-level layouts are often used on narrow building lots, such as those lending themselves to row housing.

HOUSING: OPERATIONAL FORM

Since a large number of projects included in 'Building Types online' cover 'Housing', and in order to better reference the specific frameworks of publications like 'Living for the Elderly', 'Operational Forms' have been included here as an additional layer of enquiry. Beyond the conventional forms of housing, specific 'Operational Forms' pursue particular concepts of living together to the extent that they influence the morphological and organizational structure of a building's layout. Applying specific processes of developing, designing, erecting and running a habitat aims to facilitate models of communal living, participation, the delivery of care and services and the specific combination of programs.

Assisted/Serviced Living
If a residential complex with conventional apartments is designed for specific user groups, the apartments can be supplemented by services reminiscent of living in a hotel including communal facilities such as a foyer with concierge, club rooms, etc. If built for seniors, such buildings are often equipped for barrier-free needs, and can have an integrated provision of personal services and health care as required.

Co-housing
'Co-housing' is a form of co-habitation where residents opt for a form of voluntary living together beyond kinship. This often translates into generous shared areas with various programs, while the privacy of the individual's domains can become more important than in a family. Consequently, rooms sometimes have en-suite bathrooms.

Cooperative
Different from the traditional housing cooperative – a membership-based corporation with tenancies dependent on the purchase of shares entitling the participant to occupy an apartment – this form of collaborative housing tenure is often initiated by tenants and predominantly used for smaller housing projects. The future residents sometimes assume the role of a property developer by setting up a joint building venture – they bear the economic risk but gain the advantage of participating in the design of the entire building and the individual apartments from the ground up. Consequently, the tenants have the opportunity to adapt the standard and size of their units to their individual budgets and lifestyles, and even to form a community prior to the completion of the building. Flexible floor plan layouts with intelligently placed support, access and supply structures allow for individual floor plan solutions and also incremental approaches.

Housing for Special Populations
Institutionalized forms of residency may accommodate tenants with a similar personal status who previously were unknown to each other. Examples are senior residences, student and faculty housing at higher education institutions or single-room occupancy hotels for formerly homeless people. Floor plan layouts often apply linear corridor typologies common to hotels or hospitals with a series of private rooms with en-suite bathrooms and sometimes kitchenettes. But single-room apartments can also be deliberately combined to form a larger communal unit with shared spaces.

Housing with Communal Focus
Residential buildings that use integrated programs such as a children's nursery, eldercare, community centers or other amenities as communal interfaces targeted at a wider neighborhood area. Sometimes driven by concepts of communal living and mutual neighborly assistance, such projects can also be combined with nursing care or assisted living facilities.

Intergenerational Living

Buildings where different generations live together in various ways often accommodate diverse housing requirements and are responsive to changing demands as residents grow older – whether that be as a traditional family unit or in the context of an 'extended family'.

Live/Work

In contrast to simply having a desk to work at in a multifunctional area, working from home in such buildings can take place entirely in a dedicated section of the apartment, which often has a separate entrance to receive clients or collaborators.

Participatory Design

'Participatory Design' involves future residents as active stakeholders in the design decision processes to meet their individual needs and expectations. This can be initiated either by the residents themselves or by the developer or architect, and can encompass the individual units or also the entire structure of the building.

Self-Construction/Incremental

Incremental approaches strategically anticipate evolution over time. The designs supply initial and to a certain extent incomplete structures, that actively encourage subsequent expansions and alterations within a specific framework to flexibly adapt to changing demands.

They are often implemented in low-cost housing projects that can partly be built out by the tenants themselves. The basis for such buildings is the division of the built form into a primary structure including the load-bearing system, circulation, core elements of the technical infrastructure and in many cases the outer shell, which are necessarily constructed by professionals, and a secondary structure that can be built by the tenants themselves without too much professional expertise.

Residential Nursing Home

'Residential Nursing Homes' are an institutionalized form of residency primarily for elderly people, who are no longer able to independently take care of themselves and require some level of nursing care. Their layouts often apply linear corridor typologies similar to hotels or hospitals, which lead to a series of private rooms with their own bathrooms. Single-room apartments with en-suite bathrooms and sometimes kitchenettes can also be combined to form a larger communal unit with shared spaces.

HOSPITALS FLOOR PLAN LAYOUT

Atrium Plan

The various functional areas of a building either encompass or are arranged along a multi-level atrium. In most instances, this dominant space does not only contain open galleries for horizontal circulation with direct access to the functional areas, but also vertical circulation elements such as prominent open flights of stairs or transparent elevator shafts. Depending on the function of the building, the atrium can be used as a lobby space or as an important shared resource area used for joint activities.

Court Plan

Various building parts or a single bent volume encompass an often geometrically shaped and centrally located courtyard – either fully or on at least two sides – which forms the project's dominant spatial and organizational feature. This courtyard area can be used for joint outdoor activities, as a recreation zone or as a buffer space for daylighting and ventilation.

Street Plan: Comb/ Matrix
The 'Street Plan' uses the internal circulation routes as zones for social encounters, often with a main 'street' – sometimes several stories high – forming the main circulation spine and social focus for shared activities. In a typical 'Comb' layout, secondary circulation routes run laterally to the main street, giving access to different facilities. As a 'Matrix' the plan also expands in width like a street grid – sometimes with integrated courtyards for illumination and with other circulation spaces running parallel and lateral to a primary one

Interconnected Ensemble
The 'Interconnected Ensemble' distributes sections of functional components – similar or different in program – among a number of pavilions or buildings, grouped together to form a compositional ensemble. The blocks can be different in form, scale and height to suit the programs they accommodate. Connected by passageways or penetrating each other, the building blocks sometimes enclose courtyard or campus-like open spaces.

Linear Plan
The 'Linear Plan' describes linear (but not necessarily straight) buildings with a central corridor and day-lit rooms on both sides. The main spaces may be located at the side offering privileged daylighting conditions or favorable orientation, while auxiliary spaces are placed on the other side. A hall and entrance are usually located at one end, which may result in long walking distances.

Deep Linear Plan
'Deep Linear Plan' describes linear (but not necessarily straight) deep buildings with at least three tiers in their floor plan layout. The main spaces requiring daylighting are set along the facades. The middle zone, sometimes with daylight either from the short end of the building or from above through skylights, can accommodate access cores, auxiliary functions or other areas not requiring daylight, but also atriums as joint activity zones with integrated circulation.

Stacked Programs
Various programs are stacked on different levels, sometimes as a generous vertically open sequence of spaces connected by ramps or circulation cores. In cases such as a podium building with a slab or tower on top – also called "Breitfuss" (German for wide foot) – public programs demanding horizontal expansion are set in the base, while rooms along corridor arrangements for other purposes are lined up in the tower or slab above. 'Stacked Program' layouts are predominantly found in relatively dense urban areas.

OFFICE LAYOUT

For this building type the focus is on the individual workspace, and how they are combined and arranged to generate specific working environments.

Cellular Offices
'Cellular Offices' typically come along as series of individual and separate office rooms aligned along one or both sides of a corridor. They are quite common for administrative functions and other contexts where individual work requiring concentration is desired. Spaces for encounters and communication are accommodated in specific areas.

Open Plan: Office Hall & Landscape
The only fixed elements in 'Open Plan' layouts are the facade enclosure, vertical cores with staircases, lifts, restrooms and other auxiliary functions, the load-bearing structure and in some cases atria. Otherwise this layout is meant to be entirely flexible; different spatial qualities emerge with

increasing distance from the facade or adjacency to access spaces and are usually not confined into separate zones. Even though this layout is conducive to encouraging spontaneous encounters and communication, it can also negatively affect individual work requiring concentration.

Group Offices
'Group Offices', often with a maximum of about 25 persons accommodated in one space, try to apply the advantages of 'Open Plan' layouts while avoiding its negative effects. Spaces that are usually smaller and not as deep as 'Open Plan' layouts give most of the work stations sufficient access to natural light while also establishing a visual connection to outdoor spaces and possibly natural ventilation. Work stations in 'Group Offices' can be arranged in single or double bays, along a shared, open corridor or in relation to other circulation zones. The layout is meant to be conducive to the exchange of information and in-depth team-based work and is most appropriate for the creative industries.

Combined Cellular Offices & Open Plan
This layout combines the advantages of 'Cellular Office' and 'Group Office' spaces and is predominantly organized within a three-bay configuration: 'Cellular Offices' with transparent or translucent divisions are aligned along the facades, while 'Group Offices' are combined with a zone of horizontal circulation, communicative areas, meeting spaces and auxiliary functions. The peripheral spaces are meant for individual work, the central zone functions as an open communicative space.

Non-Territorial Workspace
The spatial configuration of the 'Non-Territorial Workspace' is often similar to the 'Combined Cellular Offices & Open Plan', yet with fewer 'Cellular Offices' and instead more group and standing workspaces, as well as zones specifically designed for communication. A portion of the employees no longer have fixed personalized workspaces, which corresponds to the needs of changing working environs at enterprises where many activities are conducted outside the office or staff members increasingly operate in shifting project teams that require more mobility and flexibility.

Flexible/Shell & Core
The shell (such as the building envelope) and the core (such as the fixed core with vertical circulation including escape routes, sanitary and technical areas) are arranged in a way to allow a variety of different floor plan layouts. This category does not describe a particular floor plan layout type, but potentially facilitates all the above-mentioned layout types. With its flexibility, this type is most suitable, for example, for projects where layout requirements can only be specified once the building is finished and floor plans are negotiated with potential tenants. Consequently, the building's structure and its service and circulation concepts have to allow a maximum degree of flexibility to respond to different – and to a certain extent unpredictable – requirements.

INDUSTRIAL BUILDINGS FLOOR PLAN LAYOUT

Single Hall
A single undivided space, with the potential to expand or to connect to later extensions, length- and crosswise.

Row of Halls
A series of halls arranged length- or crosswise, either directly connected or separate and accessed from an outside area.

Matrix of Halls
A series of halls arranged length- and crosswise, either directly connected or separate from one another and accessed from an outside area.

Stacked Halls

Halls are stacked on top of each other mostly due to spatial constraints – for example in inner-city developments. The circulation structure for goods and people has to be organized accordingly.

Other Functions on Same Level

Auxiliary functional areas with lower ceilings – such as offices, changing rooms and bathrooms and canteens – are based on the same level, either within the same volume or as a lower annex.

Other Functions on Upper Level

Auxiliary functional areas with lower ceilings – such as offices, changing rooms and bathrooms and canteens – are based on upper levels, either within the same volume, accessed by a gallery, or as a multi-story annex.

Other Functions on Lower Level

Auxiliary functional areas with lower ceilings – such as offices, changing rooms and bathrooms and canteens – are based on lower levels, for instance in basement spaces.

SCHOOLS & KINDERGARTENS FLOOR PLAN LAYOUT

Atrium Plan

The various functional areas of a building either encompass or are arranged along a multi-level atrium. In most instances, this dominant space does not only contain open galleries for horizontal circulation with direct access to the functional areas, but also vertical circulation elements such as prominent open flights of stairs or transparent elevator shafts. Depending on the function of the building, the atrium can be used as a lobby space or as an important shared resource area used for joint activities.

Court Plan

Various building parts or a single bent volume encompass an often geometrically shaped and centrally located courtyard, either fully or on at least two sides, which can form the project's dominant spatial and organizational feature. This courtyard area can be used for joint outdoor activities, as a recreation zone or as a buffer space for daylighting and ventilation.

Street Plan: Comb/Matrix

The 'Street Plan' uses the internal circulation routes as zones for social encounters, often with a main 'street' – sometimes several stories high – forming the main circulation spine and social focus for shared activities. In a typical 'Comb' layout, secondary circulation routes run laterally to the main street, giving access to different facilities. As a 'Matrix' the plan also expands in width like a street grid – sometimes with integrated courtyards for illumination and with other circulation spaces running parallel and lateral to a primary one.

Open Plan/Flexible Plan

Open spatial sequences seek to reduce built enclosures to a few precisely placed boundaries in order to facilitate a more fluid layout. Functional zones requiring specific conditions are if ever possible not distinctively separated from the generous circulation areas and always relate to the entire space. 'Open Plan' layouts can also expand across various interconnected levels. When such layouts are designed to be flexible, they can provide the prerequisite for a multitude of transformation possibilities in the short or long term.

Interconnected Ensemble

The 'Interconnected Ensemble' distributes sections of functional components – similar or different in program – among a number of pavilions or buildings, grouped together to form a compositional ensemble. The blocks can be different in form, scale and height to suit the programs they accommodate. Connected by passageways or penetrating each other, the building blocks sometimes enclose courtyard or campus-like open spaces.

Linear Plan

The 'Linear Plan' describes linear (but not necessarily straight) buildings with a central corridor and day-lit rooms on both sides. The main spaces may be located on the side offering privileged daylighting conditions or favorable orientation, while auxiliary spaces are placed on the other side. A hall and entrance are usually located at one end, which may result in long walking distances.

Deep Linear Plan

'Deep Linear Plan' describes linear (but not necessarily straight) deep buildings with at least three tiers in their floor plan layout. The main spaces requiring daylighting are set along the facades. The middle zone, sometimes with daylight either from the short end of the building or from above through skylights, can accommodate access cores, auxiliary functions or other areas not requiring daylight, but also atriums as joint activity zones with integrated circulation.

RESEARCH & TECHNOLOGY BUILDINGS FLOOR PLAN LAYOUT

Atrium Plan

The various functional areas of a building either encompass or are arranged along a multi-level atrium. In most instances, this dominant space does not only contain open galleries for horizontal circulation with direct access to the functional areas, but also vertical circulation elements such as prominent open flights of stairs or transparent elevator shafts. Depending on the function of the building, the atrium can be used as a lobby space or as an important shared resource area used for joint activities.

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MUSEUMS FLOOR PLAN LAYOUT

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Linear Sequence

A linear, mono-directional sequence of rooms – also defined as an enfilade – allows a clear and programmatic arrangement of the exhibition rooms. When connecting rooms along a single axis, this layout can enable a view through all spaces. A main route, such as a museum street or passage, may give access to the exhibition rooms.

....

Matrix

Exhibition rooms are linked to each other in various directions, so that the visitors are offered a number of alternative routes. Although separate rooms are still organized in a regular pattern, visitors are no longer directed along a single route.

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Interconnected Ensemble

The 'Interconnected Ensemble' distributes sections of functional components –similar or different in program – among a number of pavilions or buildings, grouped together to form a compositional ensemble. The blocks can be different in form, scale and height to suit the programs they accommodate. Connected by passageways or penetrating each other, the building blocks sometimes enclose courtyard or campus-like open spaces.

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Open Plan/Flexible Plan

Open spatial sequences seek to reduce built enclosures to a few precisely placed boundaries in order to facilitate a more fluid layout. Functional zones requiring specific conditions are if ever possible not distinctively separated from the generous circulation areas and always relate to the entire space. 'Open Plan' layouts can also expand across various interconnected levels. When such layouts are designed to be flexible, they can provide the prerequisite for a multitude of transformation possibilities in the short or long term.

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LIBRARIES: FLOOR PLAN LAYOUT

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Atrium Plan

The various functional areas of a building either encompass or are arranged along a multi-level atrium. In most instances, this dominant space does not only contain open galleries for horizontal circulation with direct access to the functional areas, but also vertical circulation elements such as prominent open flights of stairs or transparent elevator shafts. Depending on the function of the building, the atrium can be used as a lobby space or as an important shared resource area used for joint activities.

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Open Plan/Flexible Plan
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Stacked Programs
Various programs are stacked on different levels, sometimes with a generous vertically open sequence of spaces connected by ramps or circulation cores. In cases such as a podium building with a slab or tower on top – also called "Breitfuss" (German for wide foot) – public programs demanding horizontal expansion are set in the base, while rooms along corridor arrangements for other purposes are lined up in the tower or slab above. 'Stacked Programs' layouts are predominantly found in denser urban areas.

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Interconnected Ensemble
The 'Interconnected Ensemble' distributes sections of functional components –similar or different in program – among a number of pavilions or buildings, grouped together to form a compositional ensemble. The blocks can be different in form, scale and height to suit the programs they accommodate. Connected by passageways or penetrating each other, the building blocks sometimes enclose courtyard or campus-like open spaces.

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SACRED BUILDINGS: FLOOR PLAN LAYOUT

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Interconnected Ensemble
The 'Interconnected Ensemble' distributes sections of functional components – similar or different in program – among a number of pavilions or buildings, grouped together to form a compositional ensemble. The blocks can be different in form, scale and height to suit the programs they accommodate. Connected by passageways or penetrating each other, the building blocks sometimes enclose courtyard or campus-like open spaces.

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Court Plan
Various building parts or a single bent volume encompass an often geometrically shaped and centrally located courtyard, either fully or on at least two sides, which forms the project's dominant spatial and organizational feature. This courtyard area can be used for joint outdoor activities, as a recreation zone or as a buffer space for illumination and ventilation.

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Open Plan/Flexible Plan
Open sequences of spatial zones seek to reduce spatial enclosures to a few precisely placed boundaries to make the spatial experience more dynamic. Functional zones requiring specific conditions are rarely distinctively separated from the generous circulation areas and always relate to the entire space. 'Open Plan' layouts can also expand across various interconnected levels. When such layouts are designed to be flexible, they can provide the prerequisite for a multitude of transformation possibilities in the short or long term.

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Single Space
All functions are arranged and combined in one large and often high space. Other areas – if existing, such as the vestibule, changing rooms or restrooms – are subordinate and require little space.

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Stacked Programs
Various programs are stacked on different levels, sometimes with a generous vertically open sequence of spaces connected by ramps or circulation cores. 'Stacked Program' layouts are predominantly found in relatively dense urban areas.

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Axial Assembly Space
Axial seating arrangement of visitors when assembling for religious services - facing a dominant front, usually the altar.

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Centralized Assembly Space
Centralized seating arrangement of visitors when assembling for religious services around a central point of focus – either in a circular or rectangular shape.

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SOURCES
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Adam, J., Hausmann, K., Jüttner, F.: *Industrial Buildings. A Design Manual*, Birkhäuser, Berlin, 2004

Becker, Annette, 'Bauen und Wohnen in Gemeinschaft / Building and Living in Communities', Birkhauser, Basel 2015

BDU Schools – Buildings and Design Unit: *Building Bulletin 95 - SCHOOLS FOR THE FUTURE - Designs for Learning Communities*, Department for Education and Skills, UK Government, 2001

Bielefeld, B., Planning Architecture - Dimensions and Typologies, Birkhäuser, Basel, 2016

Braun, H., Grömling, D.: *Research and Technology Buildings. A Design Manual*, Birkhäuser, Basel, 2005

Ching, Francis D. K.: *Architecture - Form, Space, and Order*, 3rd edition, John Wiley & Sons, Hoboken, NJ, 2007

Cross, Nigel, 'Designerly Ways of Knowing', Design Studies vol 3 no 4, October 1982, pp. 221-227

Deplazes, A.: *Constructing Architecture: Materials, Processes, Structures. A Handbook*, Birkhäuser, Basel, 3rd ed. 2013

Dudek, M.: *Schools and Kindergartens. A Design Manual*, Birkhäuser, Berlin, 2nd and revised edition 2015

Feddersen, E., Lüdtke, I.: *Living for the Elderly. A Design Manual*, Birkhäuser, Basel, 2009

Flemming, U., Aygen Z.: A hybrid representation of architectural precedents, in: *Automation in Construction* 10 (2001) p.687–699

Hascher, R., Jeska, S., Klauck, B.: *Office Buildings. A Design Manual*, Birkhäuser, Basel, 2002

Heckmann, O., Schneider, F. with Eric Zapel: *Floor Plan Manual Housing*, Fifth, Revised and Expanded Edition, Birkhäuser, Basel, 2018

Heckmann, O.: *Urban Living*, Design Studio Lecture Series, *Urban Housing Typologies*, Course Elective Lecture Series, Architecture & Sustainable Design pillar, Singapore University of Technology and Design, 2015

Kropf, Karl, 'The handbook of urban morphology' Wiley, Chicjester, West Sussex, 2017

Leupen, B., Mooij, H.: *Housing Design: A Manual,* NAi Publishers, Rotterdam, 2012

Lawson, Bryan, 'Schemata, gambits and precedent: some factors in design expertise', Design Studies 25 (2004) 443–457

Lushington, N., Rudorf, W., Wong, L.: *Libraries. A Design Manual*, Birkhäuser, Basel, 2016

Naredi-Rainer, P.: *Museum Buildings. A Design Manual*, Birkhäuser, Basel, 2004

Neufert, E., *Bauentwurfslehre*, Ullstein Fachverlag, Berlin 1962. English edition: *Architects' Data*, 4th edition, Wiley-Blackwell, Hoboken, NJ, 2012

Prasad, S. (Ed.), *Changing Hospital Architecture*, RIBA Publishing, London 2008

Schneider, F.: "Floor Plan Idea", in: Heckmann, O., Schneider, F.: *Floor Plan Manual Housing*, Fifth, Revised and Expanded Edition, Birkhäuser, Basel, 2018

Sieverts, T.: *Zwischenstadt: Zwischen Ort und Welt, Raum und Zeit, Stadt und Land*, Braunschweig, Vieweg, 1997. English edition: *Cities Without Cities. Between Place and World, Space and Time, Town and Country*", Routledge, London and New York, 2003.

Staniek, B. & C.: "A Typology of Office Forms", in: *Best of Detail: Office - Selected Office Highlights from DETAIL*, 2013

Stegers, R.: *Sacred Buildings. A Design Manual*, Birkhäuser, Basel, 2008

Rowe, Peter G., Kan, Har Ye: *Urban Intensities. Contemporary Housing Types and Territories*, Birkhäuser, Basel, 2014

Wagenar, C., Mens, N., Guru, M., Niemeijer, C., Guthknecht, T. *Hospitals. A Design Manual*, Birkhäuser, Basel, 2018