PORTFOLIO
MY STORY OF ARCHITECTURE

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NURSING HOUSE DESIGN
Honorable mention for international student competition on open building
Group work: with WANG Chen
Title: team leader, designing, modeling, rendering
Accomplished time: second semester of the senior (2012.6)
Instructor: REN Zhen

BLOCK HOUSE
IDEA
The existence of space is constant, but its content can be variable. This is the basic principle of open building. I consider flexibility as the core of open building, which is manifested by the ability to change according to different needs of customers, natural environment and in a larger sense, the social change, so the longevity of buildings can be extended. In my design, flexibility can be embodied in 5 levels which are "selectable flat type", "resizable room box units", "adjustable balcony", "controllable communication space", "changeable functions according to social changes"
Why the aged need various types of flats?

FUNCTION UNITS

From the size of furniture, 3.8' x 4.2' = 15 ft²

COMPLEX FORMATION

MULTIPLE CHOICE OF FLAT TYPE

Now imagine you are in a supermarket, those units are your goods, and constructum and space are your basket, what you should do is just choosing your goods and arrange them in your basket.

2 Units:
The Maximum Space 15' x 10' = 150 ft²

Choose: 07 02

Choose: 08 02

4 Units:
The Maximum Space 15' x 15' = 225 ft²

Choose: 07 05 02 01

Choose: 07 05 02 02

6 Units:
The Maximum Space 15' x 15' = 225 ft²

Choose: 07 05 02 01

Choose: 07 02 01

8 Units:
The Maximum Space 15' x 15' = 225 ft²

Choose: 07 02 03 02 01

Choose: 07 02 03 02 02

12 Units:
The Maximum Space 15' x 15' = 180 ft²

Choose: 07 04 02 03 02 01 09

Choose: 07 04 02 03 02 04 09
VARIous COMMUNICATION SPACE FOR THE AGED

The aged people are likely to feel lonely so communication space is important for them which can enhance their condition of both mentally and physically. The community takes use of the formation to create various types of communication space for the old on different levels such as roof garden, bottom overhead and courtyard. The design also considers all kinds of activities of the seniors. The aged have the right to choose their favourite open space to talk, plant, read, draw and do exercise.

CONTROL THE COMMUNICATION SPACE

The aged have the right to control their own terrace. They can choose a private space reading and gardening or share it with a friend nearby to form a larger activity area playing chess or chatting. All their choice depends on their own condition such as living habit and personality.
The new unit can be pushed into the preserved space as a drawer while the old one can be pulled out. The bottom of the side wall of the box has pulleys and the linked steel beam in the structure is made into "H" shape to form a groove. We can pull the pulleys of box units into the groove like pulling a drawer into rails and then fix it when they reach the predetermined position. All these structure characters make sure that the structure and function match each other well.

CONSTRUCTION OF BOX

The boxes use dry connection, light partition wall which are convenient to be disassembled and thus to change the inner space according to needs. Walls and connection hinge use modular system which is suitable for mass production.

STEP1 Install pulleys under the side wall.
STEP2 Dry connection
STEP3 Put boxes together and remove extra walls.
STEP4 Install balcony.

CONSTRUCTION OF BUILDING

The structure is divided into 2 parts, alterable and unalterable, which are the living units and frame structure. Living units can be renewable according to needs.

STEP1 Room1 goes into the groove. STEP2 Room2 goes into the groove. STEP3 Fix the pulleys.

NURSING HOUSE DESIGN 05
**SOLAR ROOM**

Eldery can be used as solar room to warm the house in the winter and benefit for the ventilation in the summer. It is also suitable for the old to plant vegetables to maintain a good mood.

**INSPIRATION**

My inspiration comes from simple match box which can be pulled and pushed to have different sizes. I want the balcony can be adjusted to different sizes to meet different needs and habits of the seniors such as planting, reading, enjoy sunshine.

**RANDOM FACADE**

Different family and seniors may choose different flat types, different flat types may have different unit combination and thus get different sizes of balcony. Different people may also prefer different kinds of skins. So those uncertain events generate the random facade which these residents participate in the architecture design.

**MAKE FULL USE OF CONSTRUCTION SPACE**

Make use of space between columns to be public equipment wall. It could be pipe shaft or air shaft, which is beneficial for kitchen and toilet to ventilate fresh air. Partition wall in the pipe shaft can avoid two houses air mixing or being polluted. Make use of space between beams to lay water supply and drainage pipe, and set access port on the floor to make operating repair convenient. At the same time, air layer can insulate sound from floors and reduce noise.
02
URBAN DESIGN
Course work: last 8 weeks
Group work: with GUO Xiaochen, XIE Ran, WANG Chen
Title: team leader, designing, modeling, rendering
Accomplished time: first semester of the senior (2011.11)
Instructor: CHEN Xingtao

THE CITY IN THE AIR
IDEA

My design philosophy can be summarized as a huge platform sitting up in the second floor, a underground parking system and the appliance of a larger scale traditional "Lishen" mode. We try to make change to the current simple scalar framework and explore up and down city development. The high-density low floor living mode will be replaced by low-density upper level structure adapting to social conditions nowadays. To extend lifespan of old city in the new social conditions. The traditional Chinese city's characteristics and architectural features are represented by its urban form. So it's more important to protect city space than vertical faces of architecture in order to preserve the traditional spaciousness of Chinese cities.
ENVIRONMENT AROUND THE SITE

ANALYSIS OF THE SITE

PROBLEMS MET BY HISTORIC BUILDINGS
Mapping and surveying the historic buildings

PROBLEMS BROUGHT BY ROAD CONDITION
A VICIOUS CIRCLE
1. Vehicle lane is not wide enough.
2. There is no parking lot available so cars stop along the road which makes road narrower.
3. Cars stand up so much space and even parks on the sidewalk which makes the sidewalk even narrow.
4. Thus narrow sidewalk cannot attract the pass-by tourist and thus makes retail stores suffer from depression.

PARKING PROBLEM
INSPIRATION---TRADITIONAL FORM "FEN"

"Fen" is a traditional formation special in Jinan which means a lane with several courtyards on either sides, which is the most important element in traditional urban fabrication.

HISTORIC RESOURCES

LAYOUT GENERATION

1. Historic buildings are scattered active points.
2. Add new active points.
3. Add connection.
5. Axis and active points.

THE EVOLUTION OF THE TRADITIONAL FORM

- DRAFT OF GENERAL LAYOUT
  - 0. Connect the original texture of site.
  - 1. Inherit the traditional formation "fen" according to original texture.
  - 2. Pull & Push: Pull and push to create the change of view and space.
  - 3. Broke & Combine: Broke and combine to create more various space.
  - 5. Connect different parts.

MASTER PLAN

[Diagram of a complex urban plan with various labeled areas such as entrances, courtyards, and pathways.]
THE AREA DESIGNED IN DETAIL

The cultural square area for inheriting the culture and tradition of the business area and get used to the current fashion showing the characters of both usability and modern.

SPATIAL COMPOSITION

- Underground parking and transform layer of structure
- Buildings above
- Overhang platform
- Corridors above
- Underground square
- Landmark
- Roof garden

PLAN EVOLUTION

The original formation comes from Push and pull on the horizontal level. Push and pull on the vertical level. Cut off the acute angle. Add connection between courtyards, dig the underground garden and extrude high construction.
CONCESSION

FUTURE PARK ABOVE THE SEA

Competition for Weihai Jinxingding Future Marine Island
Group work: with YANG Xingzhe, CHEN Yalong
Title: team leader, designing, modeling, analyzing
Accomplished time: first semester of the junior (2011.7)
Instructor: JIANG Haitao, REN Zhan
IDEA

The coming problem is the rising sea level as an irrevocable trend along with global warming. Considering this emerging issue, my design philosophy is to make concession to sea which means to develop marine building in the future on the basis of protecting marine ecological balance to the utmost. The environment-friendly concept can make benefits for not only population growth pressure but also sustainable development between the sea and human beings.
PROBLEM & SOLUTION
As the global climate becomes warmer and warmer, the rise of sea-level becomes an irreversible trend. Since we can’t change it, we can only adapt to it. So in this project, we come up with some possible solutions to solve the problem.

1. Make horizontal road three-dimensional. Once the road of the first floor is flooded, people can move their activity into a higher floor.
2. Making islands into the sea floor, which can raise as the sea-level rises.
3. Processing the building to be waterproof, so some parts can still be well used under the water.

IDEA
We consider that buildings should not be pulling up in a time but to make adaptation to different situation such as environmental change, people’s needs and pace of time. We try to create such a growing park, which can be a garden in the air moving people in a high level as the sea-level keeps rising.

CONTEXT

SITE ANALYSIS

CONCEPT - GROW IN A VERTICAL WAY

2011  ▶  2030  ▶  2050  ▶  2080  ▶  2100
Voronoi diagrams are an important branch of computational geometry. They are used to divide space into regions based on the distance to a given set of points. In any Voronoi polygon, the distance between any point in it and its central point is less than that between the point and the central point of any other Voronoi polygon. So, they can be used to analyze public service facilities to determine their functional effect and sphere of influence. By using this method, we can make full use of facilities to serve in a maximum range of society and also reduce or avoid the waste of resources caused by repeated coverage.

**Masterplan Generation**

In this project, we set each park complex in small showroom, tea room, toilet, and vertical transport space as a control point, and then we generate Voronoi grid to determine the scope of its functional effect. The boundary of the park complex will be used as main pedestrian street, and the connection between control points will be set as overhang pedestrian bridge. The second layer overhang pedestrian bridge goes up and down in response to the undulating terrain of the first layer with some intersections between them which can avoid the fatigue caused by too long road.

**Method Dealing with Coastal Land**

Original coastline  Original area access to the sea  Coastaline and island being optimized  Coastaline being optimized  Environmental friendly—Sea scenery—Sea experiencing area
FUNCTION COMPLEX

There is a single building at each control point which is also a small functional complex unifying the exhibition, teashop and ticketing in a building. In this way, the utilization of public service facilities will be more rational. Each small single building uses sustainable development such as using spatial processing for ventilation, new materials to achieve a goal of impermeable using skin to isolation and moistureproof to reduce the effect of direct solar radiation near the sea. Meanwhile, each single building is made up by some relatively simple motifs and then composed into a more complex formation by rotating and overlapping which will facilitate the construction in the future in order to achieve the real sustainable development of building.

We use split-level processing to deal with small complex buildings to make it rise zigzag. Once we upstairs one floor, we reach the roof of a layer that is a viewing platform which can integrate with outside environment and the outdoor courtyards which have a function of ventilation. The motif of each layer could be repeated rotatingly which can facilitate the future construction.

Planar layout, including exhibition, toilet and canteen, expands contact with the outside environment while each layer has both indoor and outdoor courtyards which have a function of ventilation. The motif of each layer could be repeated rotatingly which can facilitate the future construction.

people can walk on the slow undulating land and walk through the various space naturally. The ground floor is superimposed mostly which increases outdoor public space. The spread out platform offers much space for viewing the sea and the of the second floor has a function of enframing scenery which form the extension of coastsides landscape. The first floor underground deep into the sea is used as experience lounge of the sea where people could watch the marine life play around through the glass.

Unifying spiraling rampway and platform together, a layer or half a layer's ascension will help people reach a higher platform. The spiraling rampway can be used as vertical transportation space as well as exhibition center. Another good point is that the flexibility makes people in the future increase building height as required.
ACTIVITY CENTER FOR STUDENTS ON CAMPUS

Course work last 6 weeks
Individual work
Accomplished time: second semester of the junior(2011.6)
Instructor: DENG Qingtao, ZHANG Jing

TREES
IDEA

My design refers to an enormous tree rooting at the mountain slope. The 'tree' was designed to create massive communication space and maintain the site's natural environment. Glass crystalline pipe signifies the tree trunk which provides natural lighting and ventilation to the bottom as well as vertical transportation space running through the architecture. Plentiful green roofs can achieve thermal insulation as well as create widespread gathering places. The emotional irregular form indeed can give expression to rational thinking, with close-limit functions and modes.
LOCATION & ENVIRONMENT

LAYOUT OF CAMPUS

IMPORTANT POINTS

SITE
This site is located at the foot of Snow Mountain which is surrounded by 3 roads and a square and thus it is convenient to reach. Scenery is pretty all around and an important axis of the campus is on the west.

ANALYSIS OF SITE

TOPOGRAPHY

AXIS AND NODE

PRIMARY PEOPLE FLOW

LANDSCAPE AROUND

2 PROBLEMS THE SITE FACED

1. Topography and vegetation in a natural environment

2. The activity center on the campus should meet different needs of communication

DIFFERENT KINDS OF TREES

TREES & SLOPE

TREES & SLOPE

ACTIVITY CENTER FOR CAMPUS STUDENTS
HOW TO COMBINE THE 2 PROBLEMS?

That is how to build an activity center merged in a natural environment.

The solution is **TREES!**

Trees are the most popular and local formation on the mountain which can be seen anywhere.

From human being origins, people tended to get together chatting, singing, dancing and arguing under a tree shadow if possible. The canopy of trees provide people with shelter and a sense of safety. The trunks of trees offer the support for us to rely on. People prefer to walk through the trees or rest under the trees. In short, trees are the best place for us to communicate no matter in a quite or active way.

My activity center maintains the original condition of trees and extends their geometry to the whole complex, which turns into a group of big trees with a stratified structure, as the local forest, working at the same time as a functional scheme and an environmental strategy.

**INSPIRATION**

**DRAFT SKETCH**
2 QUESTIONS
What we need in an activity center?
What is the relationship between them?

FUNCTIONS & FOOTPRINTS
It can meet various needs of students. No matter you are alone, have a company, have a group of people or there are many many people, you can always find a niche here: debating, singing, dancing, chatting, relaxing, performing and doing any thing you want to do.

According to the different size of flow, determine the size of each function area. More often the room is being used, the larger the room will be. Connect these areas, then the outline of the building can be determined.
SPATIAL STRATEGY
Reconstruct the topography to define entrances of the site, so when students can get to the center, they can be directed to the entrance of the building naturally by the hint of topography. The floor of the center is transformed into curved surface responding to the topography.

ENVIRONMENTAL FRIENDLY
Insulation
Overhead
Lighting
Ventilation
**SQUARES**

The formation spans many squares for people gathering and communicating and be a respond for the squares nearby. People can easily get from one square to another because squares are connected by the bottom overhead.
05

THE ENTITY CONSTRUCTION PROJECT
Group work: with JIANG Yin, LING Chen, BAO Yingnan,
Title: designing, selecting materials, constructing.
Accomplished time: first semester of the senior (2012.9)
Instructor: TONG Hui

MUSIC BOX
A MUSIC BOX
We create a music box using the method of parametric design which aims for providing a rest and experiencing place at the atrium of our department building. Formation comes from cutting out a curved surface from a cube and thus students can sit, stand and lie in this irregular-shaped hole. Combining knowledge of electric grid, when connected to MP3, the facade of the box can change with the acoustic spectrum of music indicating that architecture is no frozen music but lively music.

INTERIOR

Also, we can give the interior space a new logic. We could sit and lie down in the space.

SURFACE

The points have to be controlled. We have an idea that we can use music to control.

MUSIC

We can get two static states from the dynamic state.

Music can be turned into wave and we can use Fast Fourier Transform (FFT) to get the spectrum of music.
Next our work is to design some details and make the music box come true.

- **MATERIAL**
  - Paper material
  - Plastic material

- **PREPARATION**
  - Wooden Framework
  - Surface
  - Iron Wire
  - 90° Junction

- **LAYERS**

- **TECHNOLOGY**
  - Electronic controller
  - Circuit

Maybe architecture is not frozen music anymore. It is music in the future.