CTIS411 SENIOR PROJECT-I

SOFTWARE PROJECT MANAGEMENT PLAN (SPMP)

Project Name: BilPay
Project Advisor: Okyay Say
Team Number: 04

Team Members:
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Canberk Demirci
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Altuğ Ankaralı

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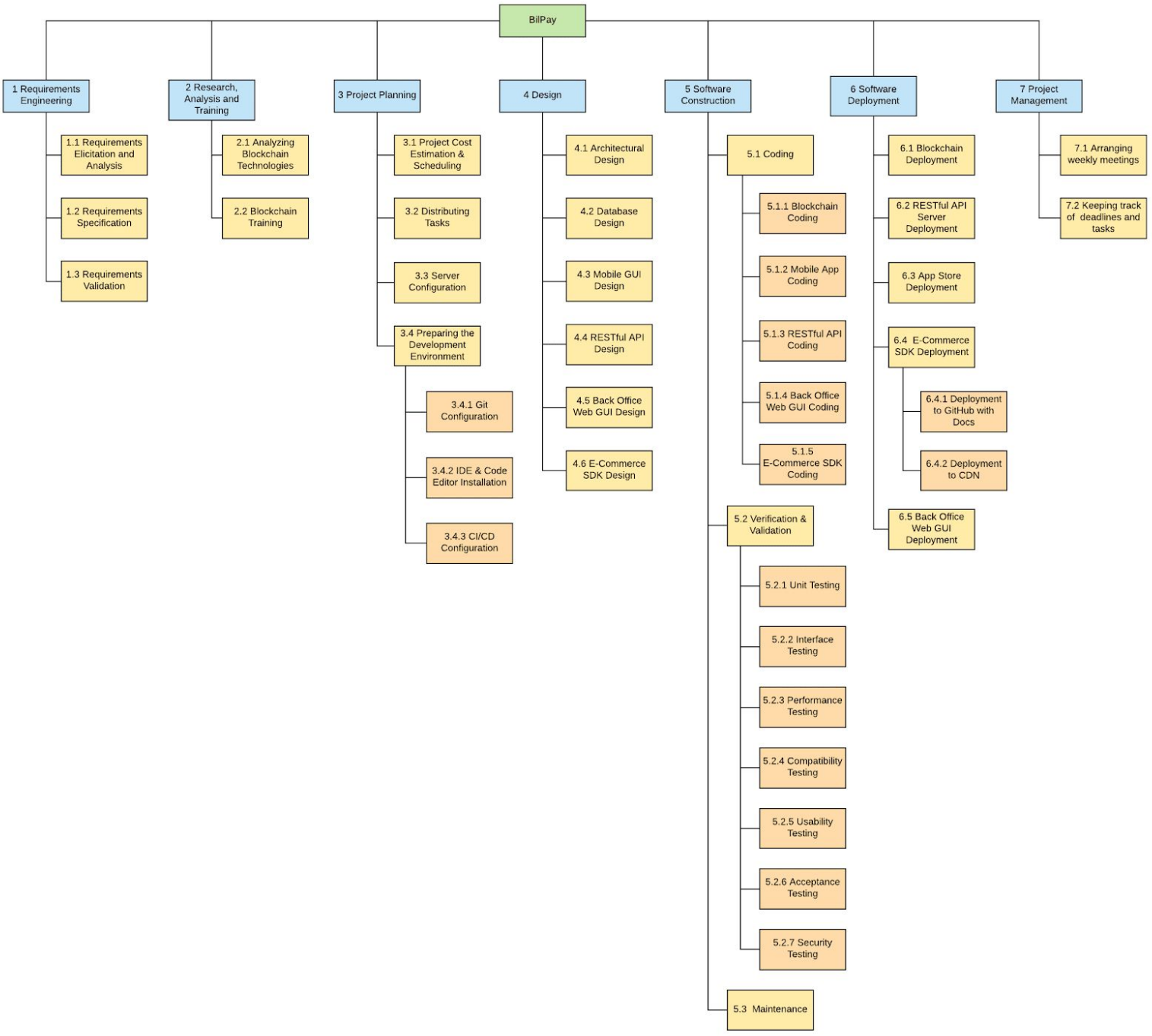
1 Project Effort & Cost Estimation

1.1 Process & Product Decomposition Based Estimation



1 Requirements Engineering		
Task Number	**Task Name**	**Duration (in days)**
1.1	Requirements Elicitation and Analysis	5
1.2	Requirements Specification	8
1.3	Requirements Validation	4
		Total: 17

Table 1- Effort for Requirements Engineering

2 Research, Analysis and Training		
Task Number	**Task Name**	**Duration (in days)**
2.1	Analyzing Blockchain Technologies	7
2.2	Blockchain Training	14
		Total: 21

Table 2 - Effort for Research, Analysis and Training

3 Project Planning		
Task Number	**Task Name**	**Duration (in days)**
3.1	Project Cost Estimation & Scheduling	5
3.2	Distributing Tasks	4
3.3	Server Configuration	5
3.4.1	Git Configuration	2
3.4.2	IDE & Code Editor Installation	1
3.4.3	CI/CD Configuration	3
		Total: 20

Table 3 - Effort for Project Planning

4 Design		
Task Number	**Task Name**	**Duration (in days)**
4.1	Architectural Design	3
4.2	Database Design	5
4.3	Mobile GUI Design	6
4.4	RESTful API Design	9
4.5	Back Office Web GUI Design	3
4.6	E-Commerce SDK Design	2
		Total: 28

Table 4 - Effort for Design

5 Software Construction		
Task Number	**Task Name**	**Duration (in days)**
5.1.1	Blockchain Coding	14
5.1.2	Mobile App Coding	11
5.1.3	RESTful API Coding	13
5.1.4	Back Office Web GUI Coding	12
5.1.5	E-Commerce SDK Coding	7
5.2.1	Unit Testing	7
5.2.2	Interface Testing	3
5.2.3	Performance Testing	5
5.2.4	Compatibility Testing	7
5.2.5	Usability Testing	4
5.2.6	Acceptance Testing	2
5.2.7	Security Testing	7
5.3	Maintenance	15
		Total: 107

Table 5 - Effort for Software Construction

6 Software Deployment		
Task Number	**Task Name**	**Duration (in days)**
6.1	Blockchain Deployment	7
6.2	RESTful API Server Deployment	1
6.3	App Store Deployment	7
6.4.1	E-Commerce SDK Deployment to GitHub with Docs	1
6.4.2	E-Commerce SDK Deployment to CDN	1
6.5	Back Office Web GUI Deployment	1
		Total: 18

Table 6 - Effort for Software Deployment

7 Project Management		
Task Number	**Task Name**	**Duration (in days)**
7.1	Arranging Weekly Meetings	10
7.2	Keeping Track of Deadlines and Tasks	10
		Total: 20

Table 7 - Effort for Project Management

BilPay		
Task Number	**Task Name**	**Duration (in days)**
1	Requirements Engineering	17
2	Research, Analysis and Training	21
3	Project Planning	20
4	Design	28
5	Software Construction	107
6	Software Deployment	18
7	Project Management	20
		Total: 231

Table 8 - Total Effort for BilPay

1.2 Function Point Analysis (FPA) / Constructive Cost Model (COCOMO) Based Estimation

Exponent Factor Estimation

Attribute	Scale Factor	Value
Precedentedness	Low	4.96
Development Flexibility	High	1.01
Architecture / Risk Resolution	Nominal	4.24
Team Cohesion	High	2.19
Process Maturity	Nominal	4.68
	Exponent Factor	**1.0808**

Category	Factor	Assessment	Parameter
Product Attributes	Required Software Reliability	High	1,15
	Database Size	Very High	1,16
	Product Complexity	High	1,15
Computer Attributes	Execution Time Constraints	Very High	1,3
	Main Storage Constraints	Very High	1,21
	Virtual Machine Volatility	Low	0,87
	Computer Turnaround Time	Nominal	1
Personal Attributes	Analyst Capability	Nominal	1
	Applications Experience	Low	1,13
	Programmer Capability	High	0,86
	Virtual Machine Experience	High	0,9
	Programming Language Experience	High	0,95
Project Attributes	Use of Modern Programming Practices	Very High	0,82
	Use of Software Tools	High	0,91
	Required Development Schedule	Very High	1,1
	Effort Multiplier		**1,4318**

Effort = 2.94 * (1000) ^ 1.0808 * 1.4318 = 7355.90

1.3 Use Case Based Estimation

The UCP is calculated based on the following formula: UCP = (UUCW + UAW) x TCF x ECF

Definitions:

- Unadjusted Use Case Weight (**UUCW**) – the point size of the software that accounts for the number and complexity of use cases.
- Unadjusted Actor Weight (**UAW**) – the point size of the software that accounts for the number and complexity of actors.
- Technical Complexity Factor (**TCF**) – factor that is used to adjust the size based on technical considerations.
- Environmental Complexity Factor (**ECF**) – factor that is used to adjust the size based on environmental considerations.

1.3.1. Unadjusted Use Case Weight (UUCW)

User Case Name	Use Case Classification	Weight
• Login • View Transaction History • Manage Profile • Register • Manage Users	Simple	5
• Promote to Merchant • Request Bilcoin • Buy Bilcoin • Integrate BilPay with Website • Cash Out	Average	10
• Send Bilcoin • Pay with Bilcoin	Complex	15

UUCW = (Total Number of Simple Use Cases x 5) + (Total Number Average Use Cases x 10) + (Total Number Complex Use Cases x 15)

1.3.2. Unadjusted Actor Weight (UAW)

UAW = (Total Number of Simple Actors x 1) + (Total Number of Average Actors x 2) + (Total Number of Complex Actors x 3)

Factor	Description	Weight	Assigned Value	Weight x Assigned Value
T1	Distributed System	2.0	1	2
T2	Response time or throughput performance objectives	1.0	5	5
T3	End user efficiency	1.0	5	5
T4	Complex internal processing	1.0	5	5
T5	Code must be reusable	1.0	4	4
T6	Easy to install	.5	5	2.5
T7	Easy to use	.5	5	2.5
T8	Portable	2.0	2	4
T9	Easy to change	1.0	5	5
T10	Concurrent	1.0	5	5
T11	Includes special security objectives	1.0	5	5

T12	Provides direct access for third parties	1.0	0	0
T13	Special user training facilities are required	1.0	0	0
			Total TF:	**45**

TCF = 0.6 + (TF / 100)
TCF = 0.6 + (45 / 100)
TCF = 1.05

1.3.4. Environmental Complexity Factor

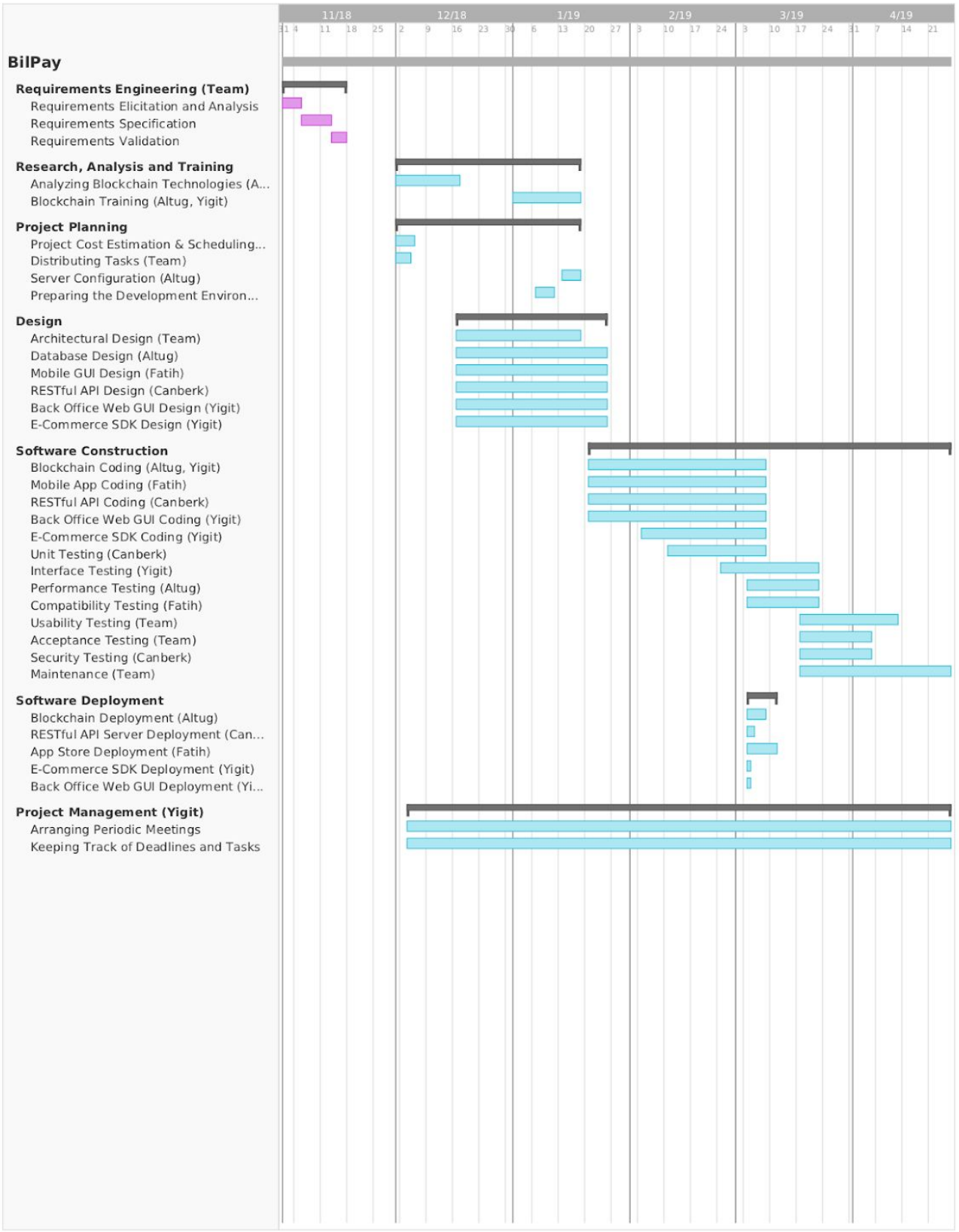
Factor	Description	Weight	Assigned Value	Weight x Assigned Value
F1	Familiar with the project model that is used	1.5	2	3
F2	Application experience	.5	2	1
F3	Object-oriented experience	1.0	2	2
F4	Lead analyst capability	.5	5	2.5
F5	Motivation	1.0	5	5
F6	Stable requirements	2.0	4	8
F7	Part-time staff	-1.0	0	0
F8	Difficult programming language	-1.0	3	-3
			Total EF:	**18.5**

ECF = 1.4 + (-0.03 x EF)
For BilPay , ECF = 1.4 + (-0.03 * 18.5) = 0.845
ECF = 0.845

1.3.5. Use Case Point

UCP = (UUCW + UAW) x TCF x ECF
For BilPay , UCP = (110 + 6) x 1.05 x 0.845 = 102.921
UCP = 102,921
Estimated Effort = UCP x Hours/UCP
For the Campus Bike Sharing System, Estimated Effort = 102.921 x 25
Estimated Effort = 2573 Hours

2 Project Scheduling



3 Project Measuring

We will gather the accompanying measurements:

What	When	How	Who
Line of Codes (LOC)	Weekly (Starting January 2019)	Github	Yiğit Usta (Project Manager)
# of Classes	Weekly (Starting January 2019)	Github	Altuğ Ankaralı
# of Use Cases	Every requirement changes	Meetups	Fatih Yavuz
# of Subsystems	Every requirement changes	Meetups	Team Members
Code Maintainability	Weekly	Meetups	Team Members
Response Time	Starting from April '19	During Test Phases	Canberk Demirci
Usability	Starting from April '19	During Test Phases	Team Members
Availability	Starting from May '19	During Test Phases	Altuğ Ankaralı
Scalability	Weekly	When the requirements done	Team Members
Reliability	Weekly	During Coding Phase	Team Members
% of Task Completion	Weekly Starting from May '19	MS Project 2018	Team Members
# of Requirements Change	Weekly	Meetups	Team Members
% of Bugs	Weekly	During coding & testing phases	Yiğit Usta
# of Errors Found During Integration Test	Weekly Starting from May '19	During Integration Phase	Fatih Yavuz
# of defects found by customs	Weekly Starting from April '19	Meetings with the Users of the System	Team Members

4 Project Controlling

4.1 Configuration Management

Team 4 will use Git as a configuration management tool. With Git, we will ensure about maintaining consistency of a product's performance, functional, and physical attributes with its requirements, design, and operational information throughout its life. Also, our advisor Okyay Say will also have access to Git to see changes. We will have a development branch process that requires a test product release every 7 days to ensure that product phases on-going stable.

4.2 Verification and Validation

Verification, Validation and Testing phases will be executed after the initial phase implemented. Team 4 will execute Testing activities and its sub activities as shown below.

- **Unit Testing**: For Web Application, iOS Mobile Application and Server Application of BilPay we will use iOS Unit Testing and Selenium Framework for Unit Testing phase.
- **Interface Testing**: We will test all the interfaces implemented in the project manually.
- **Usability Testing:** Each use cases implemented in project will be tested with its demonstrated users.
- **Compatibility Testing**: We will use different environments and software versions to test our software. We will use different web environments to test Web Application and Web Server, also we will use different versions of iOS to test BilPay iOS Application.
- **Performance Testing**
    - **Stress Testing**: Web Server, Web Application and iOS application will be tested to observe its behaviours in upper limit of loads.
    - **Load Testing**: All applications will be tested in with their regular amount of loads.
- **Security Testing**
    - **SQL Injection:** SQL Injection Testing Tools like Havij and SQL Map will be used to test BilPay's Database through various Web queries.
    - **Network Vulnerabilities:** We will use Network Snuffing Testing tool in Kali Linux OS to test BilPay's Web Applications's network.
    - **XSS**: We will use XSS (Cross Site Scripting) Testing Tool in Kali Linux OS to test which scripts accepted and implemented / applied into system.
    - **DDoS**: Necessary Test phases will be applied to make sure that system will not be affected in case of distributed denial of service attacks.
    - **Zero-day Vulnerability:** Test phases will be applied to make sure that system will not be affected in case of usage of Zero-day exploits on BilPay's Web Application and Web Server.
- **Acceptance Test:** Will be made with all the members, our advisor Okyay Say and other stakeholders.

4.3 Quality Management

To ensure product quality , Team 4 will ceaselessly inspect and dissect other projects related with our product on the market. Most recent variants of the coding measures will be pursued.

Following standards will be connected in our undertaking:

- Google’s Web Design Standards
- Google’s Web Application Coding (PHP) Standards
- ISO/IEC 9126 (Software Engineering Standards)
- ISO/IEC 25000 (Square)
- ISO/TC 307 (Blockchain Standards)
- IC17-017-01: Blockchain Asset Exchange

5 Software Development Environment

Described tools below table will be used in our project.

Tool	Version
Windows	10.1
MacOS	Mojave
Git	2.19.2
PhpMyAdmin	4.8.3
Ethereum	0.11.1
xCode	10
Swift	4
Laravel	5.4
Bootstrap	4.1
PHP	7.2
Ubuntu	18.10
PhpStorm	2018.3
Visual Studio Code	1.29.1
MySql	5.7