**COURSEWORK SUBMISSION FORM**

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| Module Name | Fundamentals of Information Technology | First Marker’s  (acts as signature) |  |
| Module Code | 4BUISO12C | Second Marker’s  (acts as signature) |  |
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| UoW Student IDs |  | **For Registrar’s office use only (hard copy submission)** | |
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| Assignment Type | Individual |

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| **MARKERS FEEDBACK (Continued on the next page)** |
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# Introduction

Case scenario

The client is a small company (with approximately 10-15 employees) that has a limited amount of a budget. The start-up wants to provide itself with the necessary software in four directions of mobile application development: **design and prototyping, development, project management, testing**. In addition, the start-up company plans to lighten itself with hardware (equipment) that meets the configurations of the software. In this report, all of the possible options are going to be analyzed, in an effort to recommend hardware and software with the most optimal set of parameters for the app development.

# Hardware and Software Review

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| Hardware Specifications | | | | |
| Name | User | Description | Specifications | Price |
| Design and Prototyping | | | | |
| iMac with Retina 5K display | Designer | * Monoblock (27 inch display) | * 3.6GHz 8-core 9th-generation Intel Core i9 processor, Turbo Boost up to 5.0GHz * 8GB 2666MHz DDR4 memory * Radeon Pro 575X with 4GB of GDDR5 memory * 1TB Fusion Drive storage * Magic Mouse 2 * Magic Keyboard | $2,499 |

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| Hardware Specifications | | | | |
| Name | User | Description | Specifications | Price |
| Development | | | | |
| OMEN Obelisk Desktop PC - 875-0030qd | Developer | * PC | 9th generation Intel Core i9-9900 Processor HyperX 16 GB DDR4-2666 SDRAM (2 x 8 GB) 1 TB PCIe NVMe M.2 SSD  NVIDIA GeForce RTX 2070 Super (8 GB GDDR6 dedicated) | $2,074 |
| OMEN X 35 Curved Monitor | * Monitor for PC | AMVA+ w/LED backlight  WQHD (3440 x 1440 @ 100 Hz)  2500:1 static | **$609,99** |

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| Hardware Specifications | | | | |
| Name | User | Description | Specifications | Price |
| Project Management | | | | |
| Surface Pro 7 (Microsoft) | Project Manager | The 12.3" touchscreen 2-in-1 laptop | Quad-core 10th Gen Intel® Core™ i5-1035G4 Processor  8GB LPDDR4x RAM  Solid-state drive (SSD) options: 512GB  Intel Iris Plus Graphics (i5, i7) | $1,058 |

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| Hardware Specifications | | | | |
| Name | User | Description | Specifications | Price |
| Testing | | | | |
| Dell XPS 13 | Tester | Laptop (13 inch display) | 10th Generation Intel® Core™ i7-10710U  2 TB M.2 PCIe NVMe Solid-State Drive  Intel® UHD Graphics with shared graphics memory  16 GB, LPDDR3, 2133 MHz, Integrated | $959,99 |

Considering that the client is a small startup with a small budget, it is necessary to choose the most optimal applications and software tools. Additionally, the types of programs should be taken into account - cloud-based platforms, which means they have service models: SaaS (software as a service), PaaS (platform as a service), and IaaS (infrastructure as a service) (IBM, (6)). In this section, the programs and software tools are sorted according to their prices and types with justifications and recommendations.

# Set A: On-premises oriented

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Design and Prototyping | | | | |
| xd01  Adobe XD  Price: Starter — $0  Single App for teams — $22.99  Creative Cloud All Apps for teams — $79.99 | MAC OS X  Windows  IOS  Android | For UX designers, using Adobe XD to develop and prototype mobile applications is the perfect solution in one go. This is the UX tool for the businesses of all types, with integrated features of adaptive resizing, auto animation and repeat grid. | **Simple and clean interfaces**  **Repeat Grid feature**  The preview feature | **Unable to redesign customised shapes** |

Firstly, the Adobe XD software tool is an ideal tool for user interface design with the option of working with multiple artboards. Also, this tool has its version in Android and IOS operating systems which indicates that in the process of creating prototypes, designers can see the result of every step (Preview). Additionally, the main competitive advantage of this program over other tools is the price – the software is cheaper compared to other programs with the same functions.

Adobe XD:

* Animation
* Collaboration
* Drag & Drop
* Software Prototyping
* Templates
* UI Prototyping
* UX Prototyping

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Development | | | | |
| 3  Appy Pie  Price: Basic: C$18, Gold: C$36, Premium: C$60 monthly. | Android, iOS, and PWA. | Appy Pie is a No-Code platform for creating a mobile application that helps developers to create apps compatible with the OS of all mobile devices (Android, iOS and Windows mobile). Customizable application templates allow companies to create organizational applications, shopping carts, games, and more based on existing application structures. | Ease of use – user-friendly live editors,  Preview the result without any sign ins.  Features – more than 50.  Customer support - quick response to problems and automatic system updates. | **Advanced feature – difficulty in the integration of 3rd party developers (for the programs: UBER or Grab Hub).** |

When it comes to development of an application, Appy Pie is an application builder with a system (DIY) - Do It Yourself, which allows users to create applications without any coding skills. The program allows users to create mobile applications with various integrated functions: application analytics, virtual and augmented reality, push notifications, CRM integration, and hyper-local integration. Additionally, providers offer a free trial and 24/7 customer support.

Deployment: Cloud and On-Premises.

Features:

* Access Controls/Permissions
* Compatibility Testing
* Source Control
* App Management
* Barcode Scanning
* Compliance Management
* Content Management
* Data Collection

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Project Management | | | | |
| wrwr  Trello  Price: **starts at $9.99 per month** | Mac OS,  Windows.  Android, and iOS (Platforms). | Trello is a group cloud project management software developed by Fog Creek Software. Trello uses a paradigm for project management. | Time & Expense Tracking  Tools for collaboration  Customizable Templates  Reformatting to any screen size | **Limited storage**  Unable to create a long-term plan  Problems in commenting (unable to edit) |

As for project management, Trello is the best option, especially considering what is offered at the lowest price. For clarity, all project management functions are available for $ 10. Trello is a Kanban board that can be customized for groups who want to work “flexibly, but do not follow the entire liturgy of agile development.” This is because it does not provide most of the flexible features that traditional software development teams require, including scrum and sprint planning, user assignment logs, problem tracking, code repositories, and detailed project reports. Plus, using a system of boards and cards, the company can plan tasks for smaller components in the Kanban system. Also, Trello has the following features:

* Agile Methodologies
* Gantt Charts
* Idea Management
* Kanban Board
* Milestone Tracking
* Portfolio Management
* Resource Management
* Time & Expense Tracking
* Customizable Templates

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Testing | | | | |
| fewf  Price: **not available** | iOS  Mac OSX  Android  Windows | The Appium is a cross-platform and open source testing tool for the operating systems iOS (hybrid and native) and Android (2.3 and higher version | Any web-driver compatible programming language can be used.  Easy setup  Multi programming language support | **Older version of Android cannot be tested**  Limited support for hybrid mobile app testing |

Lastly, testing is important part of every project which shows the status of the project – either ready or in the process. As the company works with both Android and IOS OS, it is important to have cross-platform testing tool. Appium can be one of the best option for the company, since the program supports many programming languages - Ruby, Java, PHP, Node, and Python (G2, (4)). This feature is really important for testers because all the written codes can be reused in the testing process of operating systems.

Platforms: installed-Mac, installed-windows.

# Set B: Cloud Oriented

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Design and Prototyping | | | | |
| 3252525Price: starting from 49$ monthly | MacOS,  Windows,  Android, and iOS. | Mockplus is an advanced prototyping and mobile application development tool. Mockplus made the application very easy to use, so you do not need data or technical knowledge to implement it. You can find any kind of templates in every size according to your needs with compatibility with Android, iPad and iPhone. It has more than 3000 icons and more than 200 components. | Design resources, including managing brand and component libraries, are in the same private cloud.  Cloud storage from 10GB  -Free Trial and installment -Customizable Templates | Not available for LINUX  Multiple users cannot work on the same project at the same time. |

Starting from designing and prototyping, Mockplus is the best option for creating application projects, since the subscription includes an unlimited number of prototypes and enough space to store all the prototypes for later use in other projects. In addition, the software tool makes it possible to test on real devices and publish them in the cloud. When it comes to cloud computing, according to Capterra (2) it belongs to the category of SaaS - software as a service. As for the drawback, several users cannot work simultaneously on the same project, however other types of subscriptions include the possibility of collaboration.

Features of Mockplus:

* Collaboration
* Desktop Interface
* Drag and Drop
* Feedback Management
* Interactive Elements
* Mobile Interface
* Mockup Creation

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Development | | | | |
| C:\Users\Khatamov\AppData\Local\Microsoft\Windows\INetCache\Content.Word\35345.png  XAMARIN  Price: FREE | MacOS,  Windows,  Web browser (OS agnostic) | Xamarin is a platform for creating mobile applications (Android, Windows and IOS) that helps application developers and designers create their own mobile applications using the .NET codebase. The platform offers a number of features, including code editing, debugging, refactoring, testing, and publishing to the cloud. | Cross-platform application development -application development with Xamarin allows the user to create code that works well on different platforms.  Works on single programming language - based on C#:  easy to use,  object-oriented programming language. | **Time-consuming nature in terms of UI Development** |

For each startup, the most important is the creation of projects at the lowest cost. Xamarin is a software that creates mobile applications with the compatibility of all operating systems – a cross-platform app development platform, which means that the company does not spend money on creating the same app for other devices. In addition, this software tool works on a single programming language – C#, and it makes the ease of use. Also, it should be mentioned that the program is free to use which is high in importance for beginner companies. The only drawback is the difficulty of creating a portable version of the main interface.

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Project Management | | | | |
| C:\Users\Khatamov\AppData\Local\Microsoft\Windows\INetCache\Content.Word\4544654.png  Price: **starts at $99 per month** | Mac OS,  Windows.  Android, and iOS (Platforms). | Basecamp is a web-based program for PM and can be used from anywhere with the help of a web browser. Basecamp mainly focused on team collaboration in creating mobile apps. | **Increased Accountability**  **The software will automatically complete expired tasks.**  **Efficient Communication**  **Remote control** | Limited customization and settings  Not enough integration  Price is high for start-ups |

For project management, Basecamp is the optimal option that helps companies to manage the project and collaborate simultaneously. The program is cloud-based which means that it enables the companies and people to create self-sufficient teams and handle the project better without any group meetings. The latest version of the software includes all the tools the team needed: sharing the data, discussing ideas or planning the marketing campaigns.

Basecamp listed features:

* Client Portal
* Collaboration Tools
* Idea Management
* Calendar Management
* Third Party Integration
* File Sharing
* Mobile Access
* Real-time Chat

However, it is expensive compared to other software tools.

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Testing | | | | |
| C:\Users\Khatamov\AppData\Local\Microsoft\Windows\INetCache\Content.Word\454 y7.png  Experitest  Price: **starts at $49 per month** | MacOS,  Windows.  Android, and iOS (Platforms).  Web platforms. | Experitest is a cloud platform and provider of quality assurance tools (DevOps), which include: performance, manual testing, monitoring and manual testing for mobile applications. The software supports all mobile operating systems: Android, Windows Phone, IOS and Blackberry | User-friendly interface  CI and CD tools integration | **Paid acoount** |

Regarding the testing process, Experitest is one of the good options. Starting price is lower compared to other providers. In addition, this tool can be useful for web developers, since in the subscription mode there is a cross-browser testing function. In addition, Experitest is one of the specialized tools that help to efficiently integrate CI and CD tools and workflow.

Service model:

* Cloud, SaaS, Web
* Mobile - Android Native
* Mobile - iOS Native

Integrated features:

* Live mobile app testing
* Automated mobile app testing
* Live cross-browser testing
* Automated cross-browser testing
* Visual testing
* Global data centers
* Test development
* Open source compatibility
* Large scale test execution
* Integrations with CI tools
* Integrations with development and testing tools

One drawback of this software tool is the lack of a free trial.

# Set C: Hybrid

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Design and Prototyping | | | | |
| asd  Invision  Price: starts at $15 per month | MAC OS X  Windows  IOS  Android | Service for creating mobile application designs and prototypes and turning web and mobile design ideas into clickable and interactive prototypes and mockups. | **Easy design integration beacause of** drag-and-drop feature  **Effortless design and prototyping – clickable prototypes enables clients and designers to view designs at the same page.** | Limited customer support services |

First of all creating prototypes for applications and sites is a rather time-consuming process that requires quick response of the entire team (developers, designers and testers). InVision is a platform for collaborative development of interface layouts. With InVision, both a small team and a large corporation, a company can get a powerful tool for developing a software product, so that all stages will be visible and controlled by developers, company executives, and even customers of the finished product. In addition, this software tool is more suitable for a start-up company, since it provides a free trial for the first month and a subscription of $ 15 per month, which is the cheapest option compared to other alternatives.

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Development | | | | |
| sadadasd  Price: $5 per month | MacOS,  IOS  Android | Appsheet is No-Code platform that allows users to build mobile application from ready-made source of codes. | no-code feature  supported popular databases and platforms  user-friendly interface  Free trial | **Do not have an advanced features in premium subscription** |

Secondly, for development AppSheet is the most optimal option for this set in terms of a price. Appsheet is the cheapest development software tool in comparison to alternatives in the other two sets above. This tool has its stored source of codes in multiple sources including Dropbox, Google Drive, Smartsheet, and One Drive. Users can do customizations with features of the application even after the completion of the app.

Platforms:

* Cloud, SaaS, Web
* Mobile - Android Native
* Mobile - iOS Native

Additional features of AppSheet:

* Access Controls/Permissions
* Compatibility Testing
* Data Modeling
* Debugging
* Deployment Management
* Mobile Development
* Reporting/Analytics

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Project Management | | | | |
| dfsfs  Price: **starts at $9 per month** | Mac OS,  Windows.  Android, and iOS (Platforms). | Podio is a new intelligent structured approach to task management. | **Fast communication**  **Fully customizable**  **Full control**  **Visualizations and reports** | **No Archiving** |

As far as project management concerned, Citrix Podio is the most suitable, which has the function of tracking tasks, emails, and projects. The software possesses the SaaS Cloud Model (Aktas, (1)). Furthermore, the Podio team has great customer service – receptive to the feedbacks of the users.

Podio:

* Client Portal
* Collaboration Tools
* Cost-to-Completion Tracking
* Idea Management
* Kanban Board
* Milestone Tracking
* Portfolio Management
* Time and Expense Tracking

The only disadvantage is that the program cannot archive and store projects.

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| Software and Services | | | | |
| Name and Price | OS Support | Description | Benefits | Limitations |
| Testing | | | | |
| Безымянный  Price: Free | MacOS,  Windows,  Web | TestProject is the first community-powered and cloud based testing platform for mobile OS. | **Highly collaborative environment**  **One to One customer support**  **Free usage of all feature** | **Only one programming language (JAVA)** |

Finally, TestProject is completely free testing software. It has a SaaS Cloud service. In addition, the program provides a collaborative environment, as the number of users is large due to the free use mode. Additionally, customer feedbacks and ratings are relatively high.

Extra facilities:

* 24/7 online customer support
* Online trainings
* Webinars

# Conclusion

Taking into account each aspect, it is strongly recommended for a start-up company to choose the third option - a Hybrid Set. Since, as mentioned above, the company has a decent amount of money and should choose the best option with the lowest possible cost. It should also be noted that the company should buy hardware facilities (computers, laptops) for its employees. The set of most optimal hardware facilities are given above in the tables with the price range.

**Links to Google Doc and Github:**

Google Doc: <https://docs.google.com/document/d/1ibJ-TfE5gzAtO6z4qC5Crs5CT9E4NsgI35Js9hSL3lY/edit?usp=sharing>

Github: <https://github.com/00007922wiutstudent/00007922>

# Reference list

1. Aktas, M., 2018. *Hybrid Cloud Computing Monitoring Software Architecture*. Available from

<https://www.researchgate.net/publication/325365201_Hybrid_cloud_computing_monitoring_software_architecture>

[Accessed 3 March 2020].

1. Capterra.com. 2020. *Mockplus Reviews And Pricing - 2020*. Available from <https://www.capterra.com/p/160773/Mockplus/#comparisons>

[Accessed 7 March 2020].

1. Reviews.financesonline.com. 2020. *Trello Reviews: Pricing & Software Features 2020 - Financesonline.Com*. Available from <https://reviews.financesonline.com/p/trello>

[Accessed 26 February 2020].

1. G2. 2020. *Business Software And Services Reviews | G2*. Available from <https://www.g2.com/search?utf8=%E2%9C%93&query=testproject>

[Accessed 6 March 2020].

1. AlternativeTo. 2020. *Podio Alternatives And Similar Apps And Websites - Alternativeto.Net*. Available from <https://alternativeto.net/software/podio>

[Accessed 2 March 2020].

1. Ibm.com. 2019. *Iaas Paas Saas Cloud Service Models*. Available from <https://www.ibm.com/cloud/learn/iaas-paas-saas>

[Accessed 3 March 2020].