### **Word Count:** 1111 (without tables and reference list)

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### **Report**

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### **Introduction**

In this brief report I tried to help the start-up company with demonstration staff with software for collaborative work and suitable equipment to build a new mobile application. Doing this, our mobile application development team should consist of five people and they are product/project manager, UI/UX designer, IOS/Android developer, Backend developer and also QA engineer. We considered the Java programming language as most suitable for this start-up development, since it has many reasons and benefits to stick to it. The constant updates, cross-platform compatibility, open-source to community support and native development tools are the main perks of Java language for mobile app development. There was a slogan for this language, created by Sun Microsystems, “Write once and run everywhere” (WORE). Also Java is the best option if you need a solid app that will create the mobile app of your dreams and outweigh all the market alternatives. First of all we should make a good blueprint to build our app, brainstorm the ideas of each member, next the UI/UX designer will design the user interface, developers write codes and the tester starts testing. After ensuring the quality of our app we can publish it on the App Store and Google Play.

### **Review of computers/tools/solutions**

### **1.Project/Product manager**

**Table 1.1: Hardware**

| **Name and Price** | **Computer configuration** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Product/Project Manager** |  |  |  |  |
| Lenovo IdeaPad 3  **Price:** $745.02 | CPU: 2.4 GHz AMD Ryzen 53500U  Display: 14-inch FHD IPS (1920 x 1080)  RAM: 8GB (can be changed)  Battery: 4-5 hours  GPU:vIntegrated AMD Radeon Vega 8 | The review of the Lenovo IdeaPad 3 proves that a laptop need not be visually appealing to be a wise purchase. If you appreciate small size, clever technology, and robust chipsets, this is the device to buy. | Prise is good  Sturdier build  Vibrant display  Secured web cam  Longer battery life (lasts over 9 hours)  Comfortable keyboard | Average Build Quality  Middling battery |

**Table 1.1.2: Hardware**

| **Name and Price** | **Computer configuration** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Product/ Project Manager** |  |  |  |  |
| Lenovo ThinkPad X1 Yoga Gen 6 (Core I7)  **Price: $**1852.13 | Display: 16:10 14-inch FHD+ (1920 x 1200)IPS  Touchscreen  RAM: 16GB  Hard Drive: 512 GB SSD  Processor: 2.8 GHz core i7 family  Average Battery Live: 20 hours  Chipset Brand: Intel  Graphics Coprocessor: Intel Iris Xe Graphics  Card Description: Integrated  Wireless Type: Bluetooth | This is a 2-in-1 business laptop which you can use as a tablet. It is 360 degrees movable and has a wider Touchpad. | Touchable screen  360 degrees movable  Fantastic 16:10 display  Outstanding Performance  Garaged stylus  Excellent battery Life | Expensive  Rather plain design  No SD card slot |

**Table 1.2.1: Software Set A “Basic”**

| **Name and Price** | **Minimum system requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Product/ Project Manager** |  |  |  |  |
| [CluckUp](https://clickup.com/)  **Price:** Free | Available for Windows, Mac and Linux operating systems  100 MB Storage | All-in-one project management tool and easy to use | Unlimited Tasks  Unlimited Free Plan Members  Collaborative Docs  Real-Time Chat  Unlimited Custom Views  Native Time Tracking  In-App Video Recording  24/7 Support  Privacy and Sharing  Template Everything  Super Rich Editing  Task Checklists  Two-Factor authentication  Time Tracking  50+ Native Integrations  Workload Profiles  Home & Scheduling  Tasks in Multiple Lists  Multiple Assignees | Only 5 spaces  Lists Per Space are only 100  Foulders Per Space are only 400  Custom fields: 100 uses  100 Automations?month  Portfolios are only 100 uses  Publicly Share Everything View  Team Sharing  Guest Visibility  Cloud Storage  Private Docs  Google Drive  Box Cloud Storage  OneDrive Cloud Storage  Live Chat Support  Default Personal Views  Contract and Legal View |

**Table 1.2.2: Software Set A-2 “Basic”**

| **Name and Price** | **Minimum system requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Product/ Project Manager** |  |  |  |  |
| [Jira](https://www.atlassian.com/)  **Price:** Free | Operating System: Microsoft Windows 7/8/10, Apple Mac OS X  System Memory: 256 MB, 512 MB is recommended  Hard Drive Space: 200 MB, 300 MB is recommended  Screen resolution: 1024x768 or better | Any team may easily set up and customize this tool to meet their unique needs. Additionally, this is a platform for managing agile projects that supports any agile approach, including scrum and kanban, or your own distinct taste | Includes 2 GB storage  Supports up to 10 Users  Offers Community Support  Always free, no credit card required  Unlimited Single Project automation  Scrum and Kanban boards  Roadmaps  Agile reporting  Customizable workflows | Permissions  Issue-level security  Anonymous Access to the projects  Sandboxes  Roles  Release tracks  Data pinning to realm  Audit logs  Uptime SLA  Email Notifications  Apps that extend Jira cloud  Project archiving |

**Table 1.3: Software Set B “Premium”**

| **Name and Price** | **Minimum system requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Product and Project Manager** |  |  |  |  |
| [Basecamp.com](https://basecamp.com/)  **Price:** $11/month/user | Microsoft Windows 7 ( 64-bit Windows)  RAM - 4GB  Intel Core I3-10510U  CPU - 1.6 GHz  System Memory: 1GB  Net framework 4.6 is required  Desktop Browser Support: Google Chrome: 87+, Mozilla Firefox: 78+, Apple Safari: 14.1+, Microsoft Edge: 79+. | Basecamp is a better way to work than just a project management tool. Basecamp users have more structured and productive teams. They demand fewer meetings and communicate more efficiently. They are also a great deal more effective than they were. Here is how Basecamps goes about doing it. | Snappy Interface  30-day free trial  Easy to use and learn  Can be downloaded both Mac or PC  Unlimited Projects  Priority support 24/7/365  500 GB storage space  Lots of features  Complimentary classes(regular free classes to whole team)  Advanced client access  Data Backup | Pricing  Real time value is not showing  No time tracking  Limited chat Management  Lack of advanced features  Limited Customization |

**2.IOS/Android Developer**

**Table 2.1: Hardware**

| **Name and Price** | **Computer configuration** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **IOS/Android Developer** |  |  |  |  |
| HP 15.6 FHD i7-1255U -U15 16GB 512GM Intel Iris Xe  **Price:** $996.95 | CPU: 2.8 GHz, Intel Core i7  Operating System: Windows 11 Home  SSD+HDD: 1T  Display: 15.6 inches, (1929 x 1080 Pixels) Full HD  RAM: 32GB DDR4  Battery: 7 hours 45 minutes  Weight: 3.86 pounds | With the latest operating system this laptop can be the best option for coders. Also other options suit for using. | The latest Windows 11  Affordable  Full HD display 15.6-inches  Good battery Life | Low Screen brightness |

**Table 2.2: Software Set A “Basic”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **IOS/Android Developer** |  |  |  |  |
| [Flutter](https://flutter.dev/)  **Price:** Free | Operating System: Windows 10 or later (64-bit) x86-64 based  Disk Space 1.64 GB  RAM: 4GB minimum, 8GB is recommended  Disk Space: 2GB | Control each and every pixel to produce unique, responsive designs that look fantastic on any screen. Build high-quality apps by controlling your codebase with plugins, testing, and development tools. | One codebase for all platforms  Rich Libraries  The opportunity to share the codebase between Android and iOS  Fast and Dynamic Code Writing | Large and Weighty apps: Applications created using Flutter, and packaged with its corresponding tools, are inherently larger than apps created natively  Limited Ecosystem  Limited Community Support  Prescriptive Tooling  Dart |

**Table 2.3: Software Set B “Premium”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **IOS/Android Developer** |  |  |  |  |
| [Android Studio](https://developer.android.com/)  **Price:** $25/ One-time developer’s license | Operating System: Microsoft Windows 8. 64-bit  CPU: 2nd generation Intel Core or newer  RAM: 8 GB or more  Disk Space: 8 GB  Display: 1280 x 800 minimum resolution | Android Studio is the official integrated development environment for Android application development. It is based on the IntelliJ IDEA, a Java integrated development environment for software and incorporates its code editing and developer tools. | Everything you need to build on  Android.  Only one-time payment  Code and iterate faster than ever  Fast and feature-rich emulator  Testing tools and frameworks  Configure builds without limits  Optimized for all Android devices  Not difficult to use  Open-source platform | Android Studio is not light weighted. It cannot be used on low configuration machines  Takes too long to build and run  Emulator is very slow  Low user purchasing power |

**3.UI/UX Designer**

**Table 3.1: Hardware**

| **Name and Price** | **Computer configuration** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **UI/UX Designer** |  |  |  |  |
| MSI Leopard 10SDK-433 Core i7 -10750H  **Price:** $1,404.37 | Operating System: Windows 10  CPU: 144GHz Intel Core i7-10750H  Display: 15.6in (1920 x 1080)  GPU: 4-4 GB RTX1660TIVGA6  RAM: 16GB DDR4  Battery: 4400  Storage: 256-512 GB SSD  Graphics Card Ram Size: 6GB  Weight: 2.4 kg | This laptop has the latest 12th generation Intel Core i7 processor. It is good especially for gaming and working with graphic design interfaces and also for 3D modeling and 3D rendering. Because of the wide screen and best RAM UI/UX designers can easily do their work. | Sound and Keyboard  HD IPS screen  The best and latest version of RTX  Accidental Damage Protection  RAM and Super fast responsive screen frequency | Bulky Design  High Price  Mediocre battery life  Issues with heating  Support Service |

**Table 3.2: Software Set A “Basic”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **UI/UX Designer** |  |  |  |  |
| [Miro](https://miro.com/pricing/)  **Price:** Free | CPU: 3 GHz (2 cores/4 threads)  RAM Memory: 8 GB, 16GB DDR4 is recommended  Network bandwidth: 8 MB/s | The online collaborative whiteboard platform Miro enables distant teams to collaborate efficiently on tasks like planning and managing agile workflows as well as brainstorming with digital sticky notes. | Rich Templates  Multiple Artifacts Single Location  Workshop experience  Free  User friendly Tool  Quality Output | The usability of the software is a little difficult  The controls are frustrating  Difficult to find what was changed |

**Table 3.3: Software Set B “Premium”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **UI/UX Designer** |  |  |  |  |
| [Sketch](https://www.sketch.com/)  **Price:** $9/month/user | Cloud Based SaaS Solution  RAM: 4 GB  CPU: Intel Core 2 Duo E8400  Operating System: Windows 7 and upwards  Graphics Card: Intel HD 4000  Chrome 86+, Safari 14+, Microsoft Edge 86+ | Sketch is the tool where all the other necessary tools are gathered in one place. The most important thing is the collaborative design process. You can create your own artwork, prototype from 0 in sketch | Free for education  Easy to use  High fidelity  30 days free trial  The all-in-one designer’s tool  Real-time collaboration  Lots of features  Can design graphics and wireframes, also good in prototyping | Only available app for Apple computers  Keyboard shortcuts  Image editing  Plugins are compulsory  Branching/versioning |

**Table 3.3.2: Software Set B-2 “Premium”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **UI/UX Designer** |  |  |  |  |
| [Figma](https://www.figma.com/)  **Price:** $11.99/month/user | Operating System: Windows 8.1 or later  RAM: At least 1 GB  A modern web browser: latest version of chrome  Display: 1024 x 768px  CPU: Intel Inside, Pentium, AMD  Space: 1 GB free space for better performance | Professionals can use the vector-based design and prototyping application Figma. Figma enables the production of everything from single design elements to whole compositions when utilized as a part of a wider design workflow. Designers use FIGMA to develop the logos, patterns, and symbols that appear on the front of websites. | All in one design prototyping, hand-offs  Easy to use  Online collaboration  30 days free trial  Quick and easy sharing files  Free Plan | Always must be online  Low user purchasing power  Issues with copyright  Lack of visibility |

**4.Backend Developer**

**Table 4: Hardware**

| **Name and Price** | **Computer configuration** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Backend Developer** |  |  |  |  |
| Apple MacBook Air (M2, 2022)  **Price:** $1185.32 | Operating System: macOS  Display: 13.6 inch  CPU: 8-core  GPU: 8-core (Configurable to 10 cores)  RAM: 8 GB  SSD: 256 GB (Configurable to 512 GB or 1 TB, 2 TB)  Battery and Power: Up to 18 hours  Memory: 8GB unified memory (Configurable to 16GB or 24 GB)  Camera: 1080p  Bluetooth: 5.0 wireless technology  Weight: 2.7 pounds (1.24 kg)  Keyboard: 78 or 79 keys including | The device features are suitable for different ranges of actions and good for backend developers. | Price is good for laptop (even it is a little bit expensive)  Excellent portability  Good Battery Life  M2 chips  Touch ID | Only supports one external screen  Fast charging costs extra  shorter battery life than 2020 M1 MacBook Air  Only two USB-C ports  Limited Storage Options  Limited Hardware Upgrades  Haet Management is not very good |

**Table 4.2: Software Set A “Basic”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Backend Developer** |  |  |  |  |
| [PHP](https://www.php.net/)  **Price:** Free | Operating System: x86 or x64  CPU: 1 GHz  RAM: 512 MB, 1GB is recommended  Free Storage space: 200MB | PHP is a free scripting language and interpreter that is mostly used with Linux Web Servers. This program is used to create complete e-commerce websites as well as manage dynamic content, databases, and session monitoring. | Free  Open-source  Improved loading speed  Wide selection of databases  Convenient  Good flexibility  various benefits provided by cloud solutions  Easy to learn  Supports All of the leading databases  Cross-Platform  Speedy | Security problems  Lack of specialized libraries  Difficult to use for large applications  Poor error handling method  Not suitable to handle a large number of adds  Affect speed and performance of websites  Lack of option to modify core behaviour |

**Table 4.3: Software Set B “Premium”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Backend Developer** |  |  |  |  |
| [IntelliJ IDEA](https://www.jetbrains.com/)  **Price:** $14.90 to $49.90 | Operating System: Microsoft Windows 8 64-bit  macOS 10.3  RAM: 2 GB minimum, 8GB is recommended  Disk Space: 2.5 GB and another 1 GB for cashes  Solid-state drive: At least 5GB is recommended  JDK version: Add Support for Java 16  Screen Resolution: 1024x768 min., 1920x1080 is recommended | IntelliJ IDEA provides a set of inspections that are built-in static code analysis tools. They help you to find potential bugs, locate dead code, detect performance issues, and improve the overall code structure | This tool is much easier to use  Supports heavy languages like Java, C++, Python  Version Control  Rich set of tools for software development  Intelligent selection  Compiling strategies, more methods of debugging and compiling  Flexible typesetting function  Streamlines both server side and client side scripting | Extremely slow (sometimes)  Uses way to much memory  The Ultimate version is quite expensive  Community support is’t too good  It is only open-core and not completely open source  can be included even more developer tools |

**5.QA Engineer**

**Table 5.1: Hardware**

| **Name and Price** | **Computer configuration** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Quality Assurance Engineer** |  |  |  |  |
| MSI Stealth GS66 Intel-Core i9  **Price:** $2701.24 | Operating System: Windows 11 Home  Display: 15.6-inches  SSD: 1TB  Battery Life: 5 hours 10 minutes  GPU: 4-8GB NVIDIA RTX 2070  CPU: 2.8GHz Intel Core i7-10750H  RAM: 16GB | One of the most reliable laptops. The ability to entirely remove the pre-installed operating system and use Kali Linux as a single boot operating system, allowing you to perform penetration testing, recover passwords, and use other resources, is the best aspect of having this device. | 10th Gen “Comet Lake-H”  Blistering 300 Hz display  Stunning high refresh rate display  Strong Gaming performance  Sound and Keyboard  Speedy video card  Speedy storage model | Bulky and Heavy Design  High Price Tag  Heating Issues  Support Service |

**Table 5.2: Software Set A “Basic”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Quality Assurance Engineer** |  |  |  |  |
| [Appium](https://appium.io/)  **Price:** Free | Net Framework: 3.5 or higher  Operating System: Microsoft Windows Vista or higher  Processor: Intel i5 or i7  RAM: 8GB  1 available USB 2.0 port  Storage: 1 GB | This is an iOS, Android and Windows desktop platform, Appium is an open-source solution for automating native, mobile web and hybrid apps. | It allows the automated testing of hybrid, native and web applications  Free  Open-source  Operating Systems  Programming languages  One-click installation  Quick connection to local or remote mobile devices  Installing and Opening Applications is quick and easy  The test recorder  Running your test scripts in an IDE  Active, strong community  Multiple mobile platforms are supported  End-to-end testing in many languages | You have to code Appium tests. A tester has to learn a programming language to be able automate test(which can take months)  Heavy maintenance  One-on-one support  Does not support testing of Android Version lower that 4.2  Inspector is not available on Windows  Might be slower than other frameworks |

**Table 5.3: Software Set B “Premium”**

| **Name and Price** | **Minimum System requirements** | **Short description** | **Benefits** | **Limitations** |
| --- | --- | --- | --- | --- |
| **Quality Assurance Engineer** |  |  |  |  |
| [Cypress](https://www.cypress.io/)  **Price:** $75/month/team | Operating System: Windows 7 and above (64-bit)  macOS 10.9 and above (Intel or Apple Silicon 64-bit)  RAM: 4 GB  CPU: Intel Core i5-4400E | Cypress consists of a free, open source, locally installed application and a Dashboard Service for recording your tests. | Free and open source framework  Modern Tool  Fast and Stable  Easy to Setup  Easy to learn  Lightening Fast Debugging  Good Documentation and Strong Community | One cannot use Cypress to drive two browsers at the same time  Doesn’t support for multi-tabs  Only supports JavaScript for creating test cases  Doesn’t provide supporting for some browsers like Safari and IE at the moment  Limited support for iFrames |

**Justification and recommendations**

**Justification**

As the product/project management does not require a superior device, so Lenovo IdeaPad 3 is the best choice for budget, but also Lenovo ThinkPad X1 Yoga Gen6 (Core i7) is the one of the best laptops for this, but it is a little bit expensive. Both of the laptops are ideal for this development. The first laptop with 2.4 GHz AMD Ryzen 53500U, AMD Radeon Vega 8, gives the best performance and benefits for the product/project managers. The second laptop is Lenovo ThinkPad X1 Yoga Gen 6 is powered by an Intel Core-i7 processor, which can do super fantastic things. This is a 2-in-1 business laptop and this is 360 degrees movable and touchable. It has a 14-inch display, which can help you in some points of design. And also the average battery life is 20 hours. As we can see it is much more expensive than the first one, but it can do tasks better and faster than that one.

There are a plethora of project management apps, so the most recommended one is Basecamp, since it is the cloud-based online with $11/month product management tool. It is appropriate for little tasks that call for cooperation and communication. You may use Basecamp as a project manager to: Create a project in Basecamp, control the discussion board, For communication, include more individuals in the project. Basecamp is a simple-to-use program. It allows for project administration on a team basis. A wide range of backup and synchronization options from third parties are supported for integration. And another two options which are completely free are Jira and ClickUp. Both of them have a wide range of options and limitations. If you want you can buy a premium one from both of them.

Designers will use more powerful laptops, since they work with Figma, Miro, Sketch, Photoshop, Adobe XD. As we all know these apps are not just apps, they are much heavier than other apps and they require high end devices, so the MSI Leopard 10SDK -433 Core i7 is the most suitable high equipped hardware for this task. It is not too heavy a laptop which is around 2.4 kg, so there will be no problem with carrying it. It can handle the detailed views and graphics with RAM 16GB DDR4 and Display 15.6-inches. As a software tool, I can recommend Sketch or Figma, both of them are powerful enough to handle the requirements of this task. Both of the minimum requirements are similar enough. And another option is Miro which is free, but this tool has lots of limitations in the free version.

The real development of mobile applications is a much difficult field, so it requires highly equipped laptops. So we will choose HP 15.6 FHD i7-1255 U Iris Xe laptop for this task. It is not too expensive, additionally you can code easily without any difficulties. It has the latest version of Windows 11 and a colorful display with Full HD. Also other laptop configurations are very good. As a software tool I recommend Android Studio which is $25 one-time pays and another one is Flutter which is free. Both of them have benefits and some limitations.

For Backend Developers, I recommend the Apple MacBook Air (M2, 2022) as a hardware tool. The device features are suitable for different ranges of actions and good for this project. Price is a little bit expensive, which is $1185.32. But this laptop has good battery life, M2 chips. The software tools for our backenders are IntelliJ IDEA and PHP. The second one is free but has lots of limitations. The first software tool is most popular for its great performance during big projects. It has a free community version, and the available tools are enough to build the whole application. User friendly interface and the key mapping preferences gives you the opportunity to boost your performance.

For QA Engineers, as a hardware tool, MSI Stealth GS66 Intel Core i9 laptop is recommended. You can completely remove the pre-installed operating system and utilize Kali Linux. This has more features and tools for testing than any other system. It has a 15.6-inches display and best storage support and the battery life is good which can help our testers to work whenever and wherever they want. As software tools Appium which is a free one and Cypress which is $75/month/team.

**Recommendations**

The recommended software set: IntelliJ IDEA, Figma, Sketch, Android Studio, Jira, Appium, Basecamp.

These recommended and mentioned above software sets are the most famous and best software tools for developing android applications. So we recommend that you consider the staff skills and knowledge when you are hiring the developers.

All of the hardware tools which are recommended above are cool for developers.

**Conclusion**

Overall, our mission was to give the best options for hardware and software devices and tools to start our start-up, which was creating a new mobile application. We choose the programming language Java to build our app and the best laptops from the brands Apple , Lenovo, MSI, HP to build our app. We have created tables with “Basic” and “Premium” options, where you can choose the devices according to the budget of your start-up. The all given above hardware will help you to run and work with the recommended software easily and well, they will boost your productivity mostly.

**Links**

**1.Google Docs:** [CSF.CW1.00014812](https://docs.google.com/document/d/1Hscjs9RQxSL3PWyvccqHXar0gxlNS66NfJD18aB7YHA/edit#) (<https://docs.google.com/document/d/1Hscjs9RQxSL3PWyvccqHXar0gxlNS66NfJD18aB7YHA/edit#>)

**2.GitHub:** [CSF\_CW1\_00014812](https://github.com/westminster-bis/csf2022-cw1-00014812_alone)

(<https://github.com/westminster-bis/csf2022-cw1-00014812_alone> -the main github repository)

(<https://github.com/00014812/CSF_CW1_00014812.git> -another github repository)

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