

## **Capstone Project Proposal**

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### **Introduction**

In modern city, there are increasing number of families that both parents are working, although this is good for economic and gender equality, it reduces the time and effort that parent can spend with their children. While some parents are really working hard and actually has improved the life standard of the family, many of them can only spare very little amount of time to strengthen the bond with their children, which is a key factor to child raising. Some of them choose to buy gift to make up for the missed time, but this will only give parents the false satisfactory and is no equivalent to interactive parent-child activities.

As many have recognized the importance of parent-child activities, it would be challenging to regularly spend enough time to participate with heavy workload or even far distance business travel. There are books and online resources teach parent the rules or principles of such activities, but most of them are difficult to be fitted into current high paced lifestyle. The proposed product will help parent to build a sustainable, instead of perfect, parent-child activity habit. This product will be a mobile App that can take the daily routine of the family and the basic information of children as input, to provide a customized parent-child activity plan with alarm reminder with tracking function. These plans are made based on the workload and schedule of parents as well as the characteristics and interests of children, so that parents can feel less exhausting about participating and will be more likely to maintain the plan, and children can have most of the fun within a limited amount of time.

### **Related Work**

According to the search result in current App market and the Internet, there is no similar product that serves the functions described above, the majority products mainly assist the communication between parents and education institutions or children day care

centers, other products help parents reach out to other skilled people online to offer interactive online contents to children. Although these solutions might help, none of them is comparable that helping parents developing a habit or routine that themselves spend time with their own children. Most people and families do not need a perfect plan, which may be good for children but too demanding for working parents to carry on, they only need a sustainable plan as a start of the change, this is exactly the product brings with.

### **Approach**

As mentioned above, this product will be a mobile App, that takes users input, which are daily routine of parents and characteristics of children, and provide customized plan with alarm with tracking function. This is a three-layer architecture product, the UI layer handles all the interaction with user including register, type in input, provide output plan, and track progress. The application layer receives the inputs from user and retrieve data from database via algorithm and return desired output to user via UI layer. Façade design pattern will be used to process different types of user input. The database layer stores all the necessary information for application layer to fetch or modify. The key parts would be the appropriate parent-child activities that are stored in the database and the algorithm to retrieve the reasonable activities based on user inputs. The algorithm would divide the daily routine of parents into different groups via applying certain real-life bounded conditions, then combine the children's age and interests to match the activities that the parents can actually spend time with their children.

Preferably there will be three different plans for parents to choose at the plan page, after one of them is selected, the track function starts by prompting a start date to choose, then the alarm reminders during the period of the plan will be displayed for user to modify and confirm, once being confirmed, the alarms will be set to the mobile phone, and the plan starts. Once the plan starts, a curve of tracking the plan status is available in track page, with horizontal axis is the time and vertical axis is the percentage of completion for

current plan.

An Acer laptop with Windows 10 OS and a mobile phone with android OS will be used as these are the most convenient hardware at this moment, Java will be used to realize the function of application layer, Javascript will be used to program UI layer and MySQL will be used to create and manage database layer. Android Studio will also be used to simulate the Android environment on Windows.

### **Deliverables**

There are seven weeks including current week and the final week, for the first week, the database design will be completed with UML diagram, as well as the overview of the whole product system. For the second week, the database will be implemented with actual data, categorization of user inputs and activities will be manually listed to help create and test the match algorithm. For the third week, in application layer, the algorithm will be developed and tested. For the fourth week, the register and input UI will be developed. For the fifth week, the output plan and status track UI will be developed. For the sixth week, the alarm function will be added to the application layer. For the seventh week, the final validated product will be presented. It is worth mentioning that, due to the actual time constraints and workload, deliverables mentioned above might be modified, any updates will be documented.

### **Evaluation and Risks**

The product will be considered working when it runs with no error and always provide appropriate plan according to user inputs within three seconds and can set the alarm as user agrees and can track the plan progress correctly. For example, if it takes ten seconds before the plan shows up, it is not feasible; if a father gets home from work at 5 p.m. and the son loves reading, then a fifteen-minute reading session is appropriate, while a boxing practice at 4 p.m. would be unrealistic. As mentioned, the parts that may go wrong can be plan shows up too slow, provides unrealistic plans or even the alarm will not

go off. Properly designing the database and applying efficient match algorithm can reduce the processing time; carefully designing the condition of the match algorithm is crucial to provide the reasonable plan. An additional measure is to add an option says ‘this plan does not suit my input’ can be selected by user, and user can choose reasons like time, or types or activities, once activated, the algorithm marks all previous result to an ‘abandoned’ status and ready to restart the matching based on the user’s corrections.

### **Conclusion**

This product demonstrates the student’s ability to utilize the knowledge and skills learned in courses, such as software engineering, database system and algorithm into practice. At the same time, the final product has the potential to solve real life problems for its users.