**范文**格式

1. 为啥喜欢带入主题
2. 说出所有认识的计算机相关知识，形容一下自己的想法，自己得到了啥
   1. 其中包含一个最深入的知识点并且好好讲解一下自己学习的历程和反思
3. 自己的Project，主要的领域是什么（e.g. Machine learning），详细经历（一路上有过什么改变和想法）和反思
4. 课外活动以及为什么这些课外活动对于自己的申请有帮助
5. 为什么要申请这个好大学（因为最好的那些大学可以让我更好的研究钻研）

第一段：为啥喜欢

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第二段：展示认识的计算机知识

* Graph algorithm: 有没有路径BFS DFS—>最短路径
  + undirected graph
  + directed graph
  + Dijkstra’s algorithm

第三段：Project

* Maze Project （DFS, Union find, 最基本的standard draw调用）
  + 一天看到一张图挑衅（解迷宫），正好我学到DFS，我感兴趣，去解，但只能做到手动创造新迷宫去解，没办法去识别迷宫（classification related technique can be implied to scan），关联并提出对machine learning的了解和兴趣，现在做不了，想到大学去做

第四段：课外计算机活动

* 之前的VEX机器人比赛想办法联系一下了解参赛时的机器人代码大概是什么样的，用的什么语言，大概有些什么

第五段：为啥fit那些好大学

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**范文**

I started competitive programming with QuickBasic when I was 13. In these years, Computer Science never failed to fascinate me with its seamless flow of logic. As I dived deeper into the ocean of computing knowledge, the many nuanced but powerful variance of algorithms constantly pushed me to explore further into the region.

At a young age, I came across programmes solving Hanoi towers and the logic behind piqued my interest. I enjoyed understanding straightforward but elegant algorithms such as DFS, but more advanced algorithms like singlesource shortest path got increasingly abstract. What’s more, I drew graphsand demonstrated algorithms step by step to observe how algorithms work in detail. I felt that understanding design principles behind them was more important than regurgitating. When I studied red-black tree in ‘Introduction to Algorithms’, its similarity with AVL trees drew my interest. Although AVL tree theoretically has more stable search performance, red-black tree is used more commonly as a built-in type in most standard libraries. After doing research online and making comparisons with analysis from other algorithm books, I understood that the trade-off between structure and efficiency gives red-black tree more advantages. Red-black tree eliminates the chain effect in rotations by ensuring that the changes in colour are within three layers. At the expense of rigid balanced structure, which slightly compromises the search efficiency, the number of rotations needed for maintenance reduced significantly. In this way, designed trade-offs in algorithms enable more desirable performances, which inspired me not to study algorithms detachedly but to query and research on the possible modifications and links between them.

Computer Science introduced me to exciting knowledge beyond traditional algorithms, such as machine learning. In a project of detecting fake news on social media, I learnt about how the choice of models may be affected by data. I first studied basic models through university lecture materials and singled out SVM and logistic regression as the most suitable for our case. After being tested with different batches of training data, logistic regression seemed to behave more stable than SVM. This was mainly due to the dependence of the SVM on the support vectors, as the boundary data affects the hyperplane of SVM much more than in the case of LR. Gathered from the Internet, our training data inevitably contained anomalous pieces that conflict with characteristics of authentic news articles and at that time, the outliers made me choose LR over SVM. In retrospect, it was possible to use regularisation to reduce the impact of outliers. Thus, LR is more suitable for data with many features, while SVM can be used to more conveniently deal with nonlinear classification using kernels. As I saw more examples of how modification to standard models can cater to characteristics of data, it drives me to delve deeper into more detailed study of machine learning.

Beyond curriculum, my experiences in other computing-related fields broadened my perspectives. I clinched awards in many Mathematics competitions which honed my mathematical skills for the knowledge required in Computer Science, especially in ML. As I devoted much of my leisure time to Robotics, the translation of algorithms into real-life applications, such as efficient navigation through unexplored mazes, incited my passion to pursue further study in Computer Science as I believe that there is significant potential for the seemingly intangible theories to be utilised in practice. .

With the knowledge I had for Computer Science, I hope to develop a more specific field of interest that I can focus on and research in. As I build up my foundation to prepare for more advanced studies, I believe that an opportunity to study in one of the most outstanding institutions will guide me in my exploration into the discipline and eventually enable me to construct new solutions to problems.