Executive Summary:

Establish a career track for computer scientists in the military that will provide incentives for service members to specialize in computer science and programming fields
Create new and expand existing programs to attract promising civilian and military STEM talent
Reach into new demographic pools of people who are interested in the work DoD does but otherwise wouldn't be aware of DoD opportunities

Full Recommendation 2:

Proposal: Establish a career track for computer scientists in the military that provides incentives for service members to specialize in computer science and programming fields and to get the additional training and opportunities they require to advance, and protects them from pressures to rotate into unrelated roles. To attract Science, Technology, Engineering, and Math (STEM) talent to this cadre, establish new and expand existing programs that attract promising undergraduate and graduate students in computer science, engineering, and related fields to commit to military service for a period of time in exchange for scholarships or debt relief. These recruits should have recruiting standards and training that is tailored appropriately to their unique role.

Comment: The Board believes that the future of warfare will be increasingly software-centric. The Department's strategy documents recognize this and call for the development of futuristic weapons systems that depend almost entirely on the integration of state-of-the-art software. Yet the Department is significantly challenged in its ability to develop, use, update, or acquire modern software. This mismatch is a potential flaw in the Department's current approach to technology. Consequently, the Department must increase its emphasis on computer science as a core competency of warfighting. This is a decadal effort with profound implications for the Department's ability to fulfill its mission in the future. This will require a human capital strategy that will ensure that DoD can grow and maintain adequate computer science capability and capacity for the wide range of software-centric requirements that are unmet today and will only continue to grow.

It is important to note that recruiting more computer scientists has a broader intent than simply hiring talented people who know how to write code. Effective software comes from engineers as well as designers, product managers, security experts, and user experience researchers who understand the full scope of how and why software will be used. Since the goal is to make computer science a core competency of DoD, it is vital to recognize the diversity of talent needed to achieve this goal.

The Department benefits greatly from using distinctive career tracks for doctors and lawyers, which assists in recruiting, retention, and career management for scarce, highly trained professionals with specialized skills. With respect to computer science, DoD suffers from the fact that most personnel cannot specialize. In some cases, military personnel train for an extensive period (roughly two years) and then actually work in the field for a period that is not much longer (roughly two or three years). In view of the centrality of computer science to DoD's activities, it is necessary to allow a distinctive career path, with appropriately designed and specified expectations and requirements. Moreover, this would also enhance recruiting in this field.

However, the Department can't recruit its way out of its human capital shortage in computer science and related fields. Any effort at enhancing recruiting should be complemented with an increase in the capacity to conduct computer science and cyber training internally, ensuring that uniformed, Reserve, National Guard, and civilian units are properly equipped and prepared for a software-centric future.

Background: Unsurprisingly, the world's most innovative companies prioritize computer science as a core competency of their operations. Facebook, Google, Snapchat, and Dropbox are among the many companies that fight to attract the top talent among computer scientists and engineers. In addition, many Fortune 500 companies offer computer science internships to identify and recruit promising potential employees. These include Chevron, General Motors, Verizon, Boeing, Target, Comcast, Dow, John Deere, Morgan Stanley, Visa, Booz Allen Hamilton – a number of which are not traditional technology companies, indicating how important computer science is to the operations of virtually any successful company today.

As a specific case study, in the past few years General Electric (GE) has publicly sought to transform itself from an industrial company to a digital one focusing on the industrial internet, commonly known as the Internet of Things. GE's goals necessitated a new approach and additional resources dedicated to attracting talent, which has allowed GE to recruit top computer and data scientists from companies such as Apple, Facebook, Amazon, and Google. GE is a valuable analogue for DoD: a company that once was an industrial titan but has recognized the shifting strategic environment, remaking itself into an organization that embeds computer science at its core to remain competitive in the next century. The Board envisions a Department in the future where the software developer is as ubiquitous as the mechanic. The first steps of that transformation cannot be postponed.