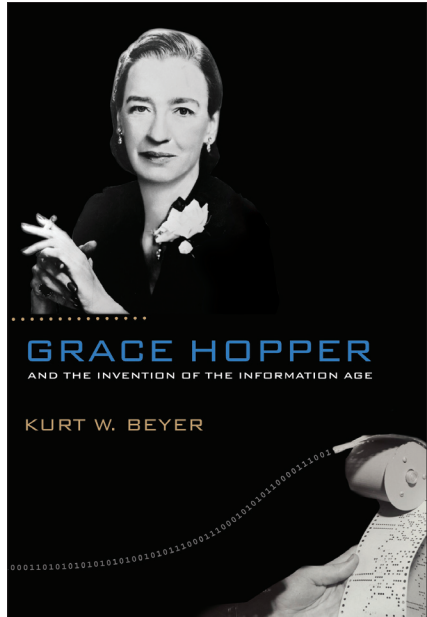


BOOK CLUB AND DISCUSSION GUIDE



GRACE HOPPER AND THE INVENTION OF THE INFORMATION AGE

KURT W. BEYER

GRACE HOPPER: MYTH AND REALITY

1. What is the “myth” of Admiral Grace Hopper according to the author? How does the youthful Grace Hopper differ from the myth?
2. Tragic events such as the United States experienced on September 11, 2001 can change the direction of a Nation, but also have a powerful affect on individuals. How did Pearl Harbor affect Grace Hopper’s career choices?
3. How did Grace Hopper’s work on complex differential equations with famed mathematician Richard Courant play a critical role during the war?
4. How did Grace Hopper handle the transition from civilian life to becoming a naval officer. What advantages did military rank and protocol provide a woman during the 1940s?
5. Explain the cultural challenges for professional women in the post-war years. Use examples from Grace Hopper, Betty Holberton, Jean Bartik, and others.
6. Who is Betty Holberton? What were her contributions to the early computer industry? How did Betty Holberton influence Grace Hopper?
7. What was Edmund Berkeley’s assessment of Hopper’s challenges with depression?

INVENTORS AND INVENTION

8. Is there a personal cost to being an entrepreneur and inventor? Provide examples in Grace Hopper’s career.
9. What made Grace Hopper unique as a teacher at Vassar. How did this experience shape her style of innovation and leadership at Harvard and later with Remington Rand?
9. Describe Howard Aiken the inventor? What personal traits allowed him to fulfill his vision of the Mark I while Charles Babbage and others failed?
10. How did the culture at the Harvard Computation Laboratory and EMCC help/hinder technical innovation?
11. What is the notion of “simultaneous invention?” Why does this phenomena occur, regardless of geographical separation?
12. What is the role of marketing in the process of technical invention and innovation? Give multiple examples from the book.
13. What was the cultural environment of the first commercial computer start-up company? How did the Eckert-Mauchly Computer Corporation differ from the Harvard Computation laboratory?
14. Compare and contrast John Mauchly and Howard Aiken’s approach to the process of technical innovation.
15. How did Hopper invent the compiler? How did this invention lay the groundwork for the explosion in the computer industry?
16. Why did Hopper invent the compiler? What were the external forces pushing Hopper and the industry in this technical direction?

The following questions can be used to guide classroom or book club discussions of *Grace Hopper and the Invention of the Information Age*.

Consider using *Grace Hopper* for your book club or course and sign up [here](#) for an opportunity to have the author join your book club or classroom by phone or video chat.

NOTE

This is an evolving set of questions. If you or your group has suggestions for additional questions to include, please email: admiralgracehopper@gmail.com with the subject line: [Discussion Questions].

17. What does the author mean by the concept of “distributed invention?” Give examples of the concept as it applies to the creation of the first high end computer languages?

18. A successful inventor must also be a keen salesperson. Defend this statement using examples from Grace Hopper’s experiences during the 1950s.

THE ORGANIZATION OF INNOVATION

19. What role did the military (Navy) and industry (IBM) play in the creation of the Mark I. What role did Harvard play?

20. How did the Harvard Computation Laboratory influence other research programs in the United States and Britain?

21. What was Hopper’s leadership role within the Harvard Computation Laboratory?

22. Discuss the wartime culture of the Harvard Computation Laboratory? How did this culture encourage/impede technical innovation?

23. What is the relationship between Howard Aiken and Charles Babbage? Why did Aiken and Hopper encourage the comparisons?

24. Why did Grace Hopper’s “history” of the Mark I differ so markedly from IBM’s interpretation? How do these differences in interpretation serve each party? Based on Hopper’s interpretation, what do we know about her perspective on inventors and invention?

25. What role did Grace Hopper play in the formation of the early computing community? What tools did Hopper employ to begin creating a forum for discussion and learning among fellow computing pioneers?

26. The 1947 Harvard Symposium on Computing Machinery organized by Grace Hopper was a pivotal moment in the creation of the nascent computing industry. What were the immediate ramifications of the Symposium?

27. What challenges did EMCC face? In what ways are these challenges common to other tech start-ups?

28. Was the takeover of EMCC by Remington Rand beneficial to the early computer industry? Was the takeover good for female employees of EMCC?

29. What is the role of government in the process of technical innovation?

EARLY COMPUTER AND PROGRAMMING TECHNOLOGY

30. Describe how the Mark I worked. From a hardware perspective, was it an electronic computer? What was the Mark I’s critical innovation?

31. A critical step in the creation of any new technology is to move it beyond the prototype phase. Discuss how the creation of the Harvard Computation Laboratory, the world’s first data processing center, was a critical step in demonstrating the utility of the new computing technology. What was Hopper’s role in managing the operations of the lab?

32. Computer programming was born during war at the Harvard Computation Laboratory. Discuss this initial process of computer coding.

33. Apart from the story of the moth in the machine, how did the notion of “computer bugs” almost undermine the new technology. How did Hopper and her team deal with this technical bottleneck?

34. How were “sub-routines” invented? How did John von Neumann’s experience at the Harvard Computation Laboratory during the fall of 1944 influence the writing of his seminal “First Draft of a Report on the EDVAC.”

35. What aspects of his stored program architecture can be attributed to his work with Grace Hopper and Richard Bloch on the implosion problem for the nuclear bomb?

36. What is a compiler? How did Hopper apply the analogy of a factory to explain how her invention worked?

37. Explain “automatic programming” as defined by Hopper during the 1950s.

38. From a design point of view, what were MATH-MATIC’s strengths and weaknesses?

39. How did Hopper and her team’s work influence John Backus and the design of FORTRAN?

40. Why did Hopper demonstrate FLOW-MATIC to management in English, German, and French? How did management perceive this demonstration?

THE EARLY COMPUTER INDUSTRY

41. In which ways was Remington Rand in a position to dominate the computer industry in the 1950s and through the 1960s?

42. According to the author, how did IBM benefit from the Cold War?

43. How does the author’s account of IBM’s success in the computer industry differ from more accepted interpretations?

44. What is the role of government in the early computer industry?

THE CREATION OF COBOL

45. Did Grace Hopper invent COBOL?

46. Explain the process of how COBOL was invented? What was Grace Hopper role within this process?

47. What were the key attributes that the CODASYL committee hoped to build into the new universal business language?

48. Why were Hopper and her supporters so adamant on maximizing the English expressions in the new language?

49. What was the designed role of the short-term committee? How did the theoretical role differ from the committee’s actual contributions to development the language?

50. “Discuss the “politics” of developing COBOL? How did Hopper control the political agenda?”

51. From a design point of view, what were COBOL’s strengths and weaknesses? What role did gender play in both the design and future critique of the language?

52. Why was COBOL wildly successful given its technical shortcomings? Explain the author’s notion of “technical closure?”

THE INVENTION OF THE INFORMATION AGE

53. Explain the “Marilyn Mealy Experiment.” Why did Hopper focus her 1959 Popular Electronics article on teaching a young woman who just graduated high school how to program?

54. What is meant by the author’s concept that Grace Hopper “democratized the computer industry in the 1950s and 1960s?”

55. Grace Hopper was the chief architect of the programming profession. Support this statement.

HISTORIOGRAPHY

56. What must a researcher consider when using oral histories? What are the benefits and pitfalls associated with this form of historical evidence?

57. What does the author mean by “distributed biography?” What is the link between the construction of the book and the author’s notion of “distributed invention?”

58. What is the challenge with researching “programming” as an invention?