THE BIRTH OF COMPUTER SCIENCE

It may come as a surprise to find a leading figure in computer science as far back as the early 19th century, and to learn that this groundbreaking figure was a woman in an age when women's role was traditionally limited to a more domestic ambit.

LEAD IN

1 **Look at the picture and answer the following questions.**

1. How would you describe the woman?
2. What historical period do you think she lived in?
3. What does the background contain?
4. What is the woman holding?
5. What contrast is highlighted here?

Share your ideas with the rest of the class.

HERSTORY

Ada Lovelace

↑ *Portrait of Ada King, Countess of Lovelace, Mathematician, Daughter of Lord Byron* by Margaret Sarah Carpenter (1836), oil on canvas, Government Art Collection.

Ada Lovelace was **0** born Augusta Ada Byron, on 10 December 1815, the only legitimate daughter of the poet Lord Byron and Annabella Milbanke. Byron was separated from his wife a month after Ada was born. Her mother, anxious that Ada might develop the perceived insanity of her father, insisted that she **1** ..... taught logic, science and mathematics from a young age – **2** ..... was rare for women at the time. From childhood Ada had a fascination with machines and numbers. When she was twelve, she decided that she wanted to fly. She studied the anatomy of birds and planned to write a book, *Flyology*, illustrating her findings with her drawings. At the age of 19 she married an aristocrat called William King. When he was made Earl of Lovelace in 1838, she **3** ..... Lady Ada King, Countess of Lovelace. In 1833 she became friends with Charles Babbage, an inventor and mechanical engineer. Lovelace was fascinated by Babbage's plans for a complicated device called the Analytical Engine. Although the 'engine' **4** ..... never built, its design had all the essential elements of a modern computer. Lovelace wrote a long series of notes about how it could work, and also created a method for the engine to repeat a series of instructions, a process known **5** ..... 'looping' that computer programmes still use today. One section of her notes described a method for calculating a sequence of Bernoulli numbers[1], which might have worked correctly if the device **6** ..... ever been built. Her work was published in 1843 in an English science journal but it would be **7** ..... than 100 years until the Analytical Engine became a reality. Lovelace's notes inspired Alan Turing's work on the first modern computers in the 1940s. Lovelace died on 27 November 1852 at just 36 and her contributions to the field of computer science were not discovered until well after her **8** ..... .

2 **For questions (1-8), read the text above and think of the word which best fits each gap. Use only one word in each gap. There is an example at the beginning (0 = born).**

1 **Bernoulli numbers:** i numeri di Bernoulli sono i termini di una sequenza di numeri razionali scoperta all'inizio del XVIII secolo dal matematico svizzero Jakob Bernoulli (1654-1705)

VOCABULARY *Lab*

3 **Match the terms (1-8) with their definitions (a-h). Write a letter in the boxes.**

1. software ☐
2. output ☐
3. input ☐
4. hardware ☐
5. data ☐
6. computational thinking ☐
7. browser ☐
8. algorithm ☐

a. A precise step by step method for solving a problem.
b. The ability to analyse ways to solve problems using appropriate algorithms and data representations, taking into account the complexity of possible solutions.
c. The data that feeds into a computation.
d. The data that results from a computation.
e. The programs that enable computers to undertake specific functions.
f. Physical items of computing equipment such as desktop hard drives, printers and scanners.
g. Information which can be stored, retrieved and manipulated in digital form using digital devices.
h. A piece of software that enables a user to locate, retrieve and display information on the world wide web.

FIRST Reading and Use of English Part 2

4 **For questions (1-6), read the text below and think of the word which best fits each gap. Use only one word in each gap. There is an example at the beginning (0 = followed).**

Great women in technology and computing. Two outstanding women in the 20th century **0** followed in Ada Lovelace's wake, making great contributions in the field of technology:

• **Hedy Lamarr** (1914-2000) is perhaps best known as one of the great female stars of the cinema of the 20th century. **1** ..... to her striking beauty she won her first role in a film in her native Austria in 1930. In 1937 she left Austria for London, where she met Louis B. Mayer, owner of the famous American MGM film studios. Meyer convinced her to leave for Hollywood, **2** ..... her grace, beauty and charming accent brought her fame and success. Hedy continued to appear in films **3** ..... 1958, but during the Second World War she worked alongside George Antheil, inventing an extraordinary **new communication system intended to guide torpedoes**. The system used **'frequency hopping' among radio waves**, with both the transmitter and the receiver changing frequencies simultaneously, which made it impossible for the enemy to intercept the radio signals. Her achievements have led Lamarr to be dubbed 'the mother of Wi-Fi' and other wireless communications like GPS and Bluetooth.

• **Grace Hopper** (1906-1992) studied mathematics at Vassar College and at Yale University. **She taught mathematics** at Vassar College until 1943 when **she joined the US Navy** and was assigned to work on the Navy's computation project at Harvard University. Here she worked on Mark I, **the first large-scale automatic calculator**, a precursor of electronic computers. Her work on **'compilers'** (a word which she **4** ..... coined), which translate programmers' instructions into computer codes, made a significant contribution to the development of COBOL (Common Business-Oriented Language), an English-language compiler widely used in the 1960s. Hopper retired from the navy, with the rank of commander, in 1966, but returned to active duty one year **5** ..... in 1967 to help standardise the navy's computer languages. She was promoted to commodore in 1983 and then to rear admiral in 1985. In 1969 she was named, rather curiously, the first 'Science Man of the Year' by the Data Processing Management Association. In 1991, one year **6** ..... her death, she was awarded the National Medal of Technology.

↑ Hedy Lamarr in the film *Let's Live a Little* (1948) directed by Richard Wallace.

↑ A publicity shot of Grace Hopper advertising the Common Business Oriented Language (COBOL), a more user-friendly computer language, 1952.

ORACY *Lab*

5 **Work in small groups and organise a 'Lovelace Day'. Look for other important female scientists who were unknown or not appreciated in their day. Choose one or two of them and prepare to give an illustrated talk.**