✓ **Congratulations! You passed!**

TO PASS 80% or higher

Keep Learning

GRADE
100%

History: Dawn of Electronic Computing

LATEST SUBMISSION GRADE
100%

1. What was the Lorenz Machine used to transmit? 1 / 1 point

- (•) Long strategic messages with lots of detail
- ( ) Attack plans between the British and Russian generals
- ( ) Intelligence between the American and British forces
- ( ) News stories from Germany to the soldiers at the front so they would feel more connected to family and friends back home

✓ **Correct**

The Enigma was used to transmit short tactical messages to many different forward positions. The Lorenz machine was used to send long, detailed, more strategic messages to the high command.

2. Who is John Forbes Nash and what is he known for? 1 / 1 point

- ( ) The creator of the internet
- ( ) A famous spy during World War II
- ( ) An actor in the movie A Beautiful Mind
- (•) A mathematician and founder of modern day Game Theory

✓ **Correct**

John Forbes Nash was a brilliant mathematician who is best known for his work on non-cooperative equilibria in game theory (now called the Nash Equilibrium). He was awarded the Nobel Prize in Economics in 1994 for this work. In 1959, at the age of 30, he was diagnosed with Schizophrenia. He is the subject of a PBS program called "A Brilliant Madness," and the movie "A Beautiful Mind" is loosely based on his life.

3. What did the Polish Cipher Bureau give to the British? **1 / 1 point**

- A German Geheimschreiber
- A Polish dessert called the Bomba
- Access to the Polish telephone network data transmissions
- (selected) A technique for breaking encoded German Enigma messages

✓ **Correct**

The Polish gave the British the knowledge that the Enigma could be broken. This encouraged the British to work hard, and apply the brightest minds they had to the problem.

4. Why was the Enigma machine so important to the German strategy during World War II? **1 / 1 point**

- Because it allows data to be stored on punched cards and quickly read so that computer programs could easily be changed.
- Because Germany's enemies would be distracted if they believed all the mis-information in the communication
- (selected) World War II was widely distributed and could not depend on wired telephone and telegraph for communications
- Because it was the quickest way to insure that as many people as possible would be exposed to propaganda messages.

✓ **Correct**

The strategy of highly coordinated attacks with a wide variety of forces that were carefully orchestrated was a brilliant military strategy. But because so many orders were sent back and forth it made decrypting the messages easier because the British had so much access to encrypted material including routine messages with unchanging plain text.

5. What is a Modem used for? **1 / 1 point**

- (selected) Use a voice-based phone line to transmit data
- Decrypt coded German war time transmissions
- Insure that transmissions to submarines work even when they are deep under water
- Record encrypted data from wireless transmissions for later decryption.
- Retransmit lost packets so as to insure the overall reliability of Internet connections

✓ **Correct**

Modem stands for "Modulator - Demodulator" - Modulation is the act of converting data into sound and demodulation is the act of converting sound into data.

6. What kind of parts were used to make the Colossus electronic computer? 1 / 1 point

- (●) Vacuum tubes, relays, switches, and lights
- ( ) Microprocessors and random access memory
- ( ) A gas turbine that drove an air compressor
- ( ) A complex series of gears, pulleys and springs that allowed it to walk forward in a halting motion

✓ **Correct**

The irony was that all the pieces that made up the Colossus were in wide use in telephone and radio equipment for amplification. The clever idea was to use the tubes as digital switches rather than analog amplifiers.

7. What are leased lines? 1 / 1 point

- ( ) Secure lines used to connect British cryptographers to British military command
- ( ) The modern lines we connect to the Internet through
- (●) Dedicated telephone lines organizations paid telecom companies monthly to have continuous access to

✓ **Correct**

Leased lines were expensive and the cost was closely related to the distance of the leased line. Before the 1990's there was a very small amount of buried copper wire and it was used mostly for long-distance phone calls which were very expensive. So a leased line was priced to be similar to a long-distance phone call. Today most long-distance data moves across fiber optic that is capable of carrying far more data than copper so the cost is more reasonable.

8. About how many vacuum valves/tubes were there in the Colossus? 1 / 1 point

- ( ) 10000
- ( ) 150
- ( ) 12
- (●) 2500

✓ **Correct**

The amazing thing was that tubes were seen as too unreliable for 2500 to work simultaneously without failing for any length of time. The trick was to never to turn the Colossus off for months or years. And if you turn it off and on, it needs to be done very slowly to warm the tubes up so as not to break the tiny wires inside the tubes. Only an experienced phone company engineer would know that the seemingly unreliable tubes were quite reliable if left on permanently and never shut off (as they would be in a telephone switching station).

9. On the Colossus computer what was used to store and repeatedly read the encrypted message text? 1 / 1 point

- Strips of film
- A paper tape that was read using light sensitive tubes
- A spinning magnetic disk drive that was read like a tape
- A solid-state flash drive (i.e. a USB stick)

✓ Correct

The encrypted text was stored on paper tape with five hols to represent each encrypted character. The paper tape was a continuous loop that ran past light sensitive tubes at 30 miles per hour.

10. What made Bletchley park successful? 1 / 1 point

- The information provided by the Polish Cipher Bureau
- Their huge team dedicated to the purpose of decryption
- The unlimited budget available to them
- All of the above

✓ Correct

We will see a continuing theme that innovations happen when governments give plenty of resources to smart people and give them time to think and experiment and work with other bright people to solve a large and complex problem. Often the innovations they produce that transform our world are something quite different from the actual problem they were trying to solve in the first place. If we look at Bletchley Park, its stated purpose was to decrypt enemy messages during war. While this is no longer needed, their efforts produced the first reliable, production quality electronic computer that is the precursor to the electornic equipment that you are using right this minute to take this quiz.

11. Who did the Enigma machine belong to? 1 / 1 point

- The Germans
- The Polish
- The British
- The Norwegians

✓ Correct

The Wikipedia page on the Enigma is very interesting. It was originally built before the war started to encrypt business communications sent over wireless or wired networks. The Germans took the commercial Enigma and tweaked it a bit to turn it into their military version.

12. Who created the functional design of the Bombe mechanical computer use to crack Enigma codes at Bletchley Park? 1 / 1 point

- (●) Alan Turing and Gordon Welchman
- ( ) Alistair Dennison and Tommy Flowers
- ( ) Max Newman and William (Bill) Tutte

✓ **Correct**

The Bombe was a group effort with Turing providing the theory, Harold 'Doc' Keen providing the mechanical designs, and Gordon Welchman providing the critical Diagonal Board Optimization and many other creative people.

13. Where is Bletchley Park located? 1 / 1 point

- ( ) Glasgow, Scotland
- ( ) New Mexico, United States
- ( ) Sydney, Australia
- (●) Buckinghamshire, England

✓ **Correct**

Bletchley Park was located north of London and between Oxford and Cambridge. It was on a major rail line and close to the major telephone lines connecting London to the rest of the UK. It needed to be outside London to avoid the bombing that was happening in London. Being close to Oxford and Cambridge provided easy access to the brilliant scholars at those universities.