What is an ECG?
Background: The Heart

- The heart is responsible for pumping blood throughout the body.
- The heart contains two atria and two ventricles.
  - Right atrium: receives deoxygenated (used) blood from the body.
  - Right ventricle: pumps deoxygenated blood to the lungs, where the blood is oxygenated.
  - Left atrium: receives oxygenated (“new”) blood from the lungs.
  - Left ventricle: pumps oxygenated blood into the body.
Background: The Heart

- Did you know the heart runs on electricity?
  - The electrical signals that flow through the heart regulate two important rhythms:
    - Heart rate: how fast is the heart beating?
    - Cardiac muscle coordination: which heart muscles are moving, and when do they move?
- We can measure the electrical activity in the heart to ensure that there are no abnormalities or diseases of the heart
The Electrocardiogram (ECG)

- An ECG (electrocardiogram) is a test used to measure the electrical activity of the heart
- ECGs can measure
  - Time intervals
    - This allows medical professionals to see how long it takes for the electrical wave to pass through the heart
  - And the amount of electrical activity in the heart
    - This allows cardiologists to see if certain parts of the heart are being overworked
Parts of an ECG

- An ECG can be broken up into three main parts:
  - The P wave
  - The QRS Complex
  - The T Wave
Parts of an ECG: P Waves

- P waves are the first waves in an ECG waveform
- These waves represent the depolarization of both the right and left atria
Parts of an ECG: QRS Complex

- The QRS complex is the series of waves that represent the depolarization of the right and left ventricles of the heart
  - This depolarization also corresponds to the contraction of the ventricular muscles
- The Q wave is the first downward deflection following a P wave
- The R wave is an upward deflection following the Q wave
- The S wave is a downward deflection following the R wave
Example: QRS Complex
Parts of an ECG: T Waves

- T waves follow the QRS complex and represent the repolarization of the ventricles
Example: ECG Waveforms