Use Case 1: Power On
Primary Actor: User
Scope: AED device
Level: Activates the AED device for readiness
Preconditions: The AED is turned off, and there is a need to use the device.
Main Success Scenario:
1. The user presses the power button to turn on the AED.
2. The AED initiates a self-test to ensure that all critical components are functional.
3. The self-test includes verifying battery capacity, electrode connection, ECG circuitry, charge/discharge circuitry, microprocessor hardware/software, CPR circuitry, and audio circuitry.
4. If the self-test passes, the AED becomes operational.
5. The AED displays a status indicating that it is ready for use.
Extensions:
If any component fails the self-test, the AED displays an error message, and the user is prompted to contact support or replace the AED.
Postconditions:
The AED is powered on and ready for use.
In case of a failed self-test, the AED displays an error message and remains in a powered-off
state.
Use Case 2: Electrode Placement
Primary Actor: User
Scope: AED device
Level: Prepares the AED for defibrillation
Preconditions: The AED is powered on, and there is a need to use the device for defibrillation.
Main Success Scenario:
1. The AED is powered on and ready for use.
2. The user initiates the process of electrode placement by selecting the appropriate option on the AED interface.
3. The AED provides visual and/or audible prompts to guide the user in placing the defibrillation electrodes on the patient's bare chest.
4. The electrodes are placed in the correct positions as per the AED instructions.
5. The AED monitors the connection and placement of electrodes.
6. If the electrode placement is successful, the AED indicates that it is prepared for defibrillation.
Extensions:
4a. If the electrode placement is incorrect or unsuccessful, the AED provides guidance to reposition the electrodes.
6a. If the AED detects a critical issue with the electrode placement, it may display an error message and prompt the user to address the issue before proceeding with defibrillation.
Postconditions:
The defibrillation electrodes are correctly placed on the patient's chest.
The AED is ready to analyze the heart rhythm and deliver a shock if necessary

Use Case 3: Heart Rhythm Analysis
Primary Actor: User
Scope: AED device
Level: user level
Precondition: The AED device is powered on and operational and the AED has undergone a self-test to ensure proper functionality. The electrode pads placed in the correct place.
Flow:
1.Triggering Heart Rhythm Analysis:
The AED is activated, either manually by a user or automatically when turned on. Upon activation, the device starts analyzing the patient's heart rhythm.
2.Electrode Placement:
The user follows visual prompts or instructions on the AED to correctly attach the electrodes to specific locations on the patient's chest for analysis.
3.Continuous Monitoring:
As the electrodes are connected, the AED monitors the electrical activity of the heart in real-time, assessing for ventricular fibrillation or ventricular tachycardia.
4.Analysis Result:
Based on the analysis, the AED determines whether the patient's heart rhythm is shockable or not. It then prompts the user with the result, indicating the appropriate course of action.
5.Integration with Display:
The AED visually displays the analysis result on its screen, making it easy for the user to interpret the information.
Postconditions:
AED provides a clear analysis result for further action.
Exceptions:
Inaccurate Electrode Placement: If the electrodes are not placed correctly, the AED informs the user and prompts reattachment.

Use Case 4: Voice and Visual Prompts
Primary Actor: User
Scope: AED device
Level: User level
Precondition: The AED device is powered on and operational and the AED has undergone a self-test to ensure proper functionality. The electrode pads placed in the correct place.
Flow:
1.Activation Prompt:
The AED should provide a clear activation prompt upon initiation. When activated, the AED emits a voice prompt and displays on-screen instructions, guiding the user through the initial steps.
2.Analyzing Announcement:
As the AED analyzes the heart rhythm, it should audibly announce the ongoing analysis process. Simultaneously, a visual prompt may indicate the analysis phase on the display.
3.Shock Advisory Prompt:
If the analysis determines a shockable rhythm, the AED issues a prompt, both verbally and visually, stating "Shock advised" to instruct the user to prepare for a shock.
4.User Confirmation Prompt:
Users must confirm understanding before the AED delivers a shock.

5.Post-Shock Instruction:
After a shock is delivered or if no shock is advised, the AED issues further prompts, guiding the user on the next steps.
Postconditions:
AED provides clear voice and visual prompts, guiding the user through each stage of the emergency response.
Exceptions:
User Misunderstanding: If the user does not confirm understanding, the AED repeats the prompt until confirmation is received.

Use Case 5: Shock Delivery
Primary Actor: User
Scope: AED device
Level: restores the patient's normal heart rhythm
Precondition: Heart Rhythm not detected and voice
Main success scenario:
1. AED determines that a shock is indicated, identify the shock rhythm
2. AED will automatically charge itself
3. Prompt the user to deliver a shock
Extensions:
3a. It's essential to ensure that no one is in contact with the patient when the shock is delivered.
Postconditions: The patient shows a sign of a normal heart rhythm

Use Case 6: CPR and Post-Shock Care
Primary Actor: User
Scope: AED device
Level: restores the patient's normal heart rhythm
Precondition: AED has delivered a shock
Main success scenario:
1. AED will instruct the user to perform cardiopulmonary resuscitation (CPR) for a specified duration.
2. AED monitors the patient's heart rhythm and provides feedback on the quality and rate of chest compressions during CPR.
Extensions: None
Postconditions: The patient resumes a normal heart rhythm

Use case: AED aftershock monitoring and CPR instruction
Primary actor: normal people
Stake holders: patients, hospitals, manufactures
Goal: to successfully save one's life with operating AED.
Scope: after a shock is delivered and before medical staff arrives.
Level: user level
Success guarantee: after correctly use of the AED to deliver a shock to patient, the device will provide clear instruction of CPR and real-time monitoring of patient's heart rhythm, to help the user deliver an efficient CPR.
Main success scenario:
1. The user correctly uses the device to deliver a shock to patient.

2. The device detected a successful shock
3. The device provides voice/visual instructions to help user to CPR.
4. User follows the instruction and correctly perform CPR.
5. Monitoring the patient's heat rhythm and provide real-time feedback.
Extension:
1. If the device detected incorrect CPR, it would provide advice to help the user to ensure that a correct CPR is performed.

Use case: AED overall use case
Primary actor: normal people
Stake holders: patients, hospitals, manufactures
Goal: to successfully save one's life with operating AED.
Scope: the use of AED when people find else/patient is in cardiac arrest
Level: user level
Success guarantee: when user of AED correctly uses the device for emergency defibrillation while following the instruction by AED device.
Main success scenario:
1. While find patient is unconscious, call 911
2. Access to the nearest AED device
3. Press ON and follow the guidance on the screen.
4. Place a set of adhesive electrode pads on patient's bare chest and connect to the device.
5. The device analysis patient's heart rhythm and detecting a shockable rhythm.
6. While detecting a shockable rhythm, the device will charge and tell user the time to press the button to deliver the shock.
7. Following the guides provided by the device, the user starts CPR for the patient.
8. The device keeps monitoring patient's heart rhythm and provide feedback.
Extension:
1. While the device detected patient's heart rhythm is not shockable, it will tell user to continue CPR and wait for further instructions.