Exercise 5

Part 1
- The function iterates through frames, performs the appropriate steps depending on whether it's a keyframe or not, and returns true until there are no more frames or the system is terminated.
- So it checks if the current frame is within the valid range.
- If the current frame is valid for a keyframe:
  - Sets the take_keyframe flag to false.
  - Project landmarks onto the current frame.
  - Load images from the left and right cameras.
  - Detects keypoints and compute descriptors for the left and right images.
  - Compute the essential matrix between the left and right cameras.
  - Match keypoints between the left and right images.
  - Find inliers using the essential matrix.
  - Store the key points, matches, and inliers.
  - Find matches between keypoints and landmarks and perform PnP localization to estimate the camera pose.
  - Update camera poses, add new landmarks, remove old keyframes, and optimize the system.
  - Update the current pose, change the display to the new images, and compute projections.
  - Increment the current frame number and return true.
- b. For non-keyframe:
  - Project landmarks onto the current frame.
  - Load the left image.
  - Detects keypoints and compute descriptors for the left image.
  - Store the detected keypoints.
  - Find matches between keypoints and landmarks.
  - Perform PnP localization to estimate the camera pose.
  - Update the current pose and check if the number of inliers is below a threshold to determine if a new keyframe should be taken.
  - If optimization is not running and has finished, update landmarks, camera poses, and calibration parameters with optimized values.
  - Change the display to the new images, update the current frame number, and return true.

Part 3
- The main difference between the optimization in SFM to this one is the use of multithreading. While bundle adjustment is happening, the next steps in the new frames are being done in parallel.
- The opt finished and opt running control the joining of threads. If opt finished is true and opt running is false the thread is finished and the join function is called.