```matlab
export('data_segmentation_01.mlx', 'data_segmentation_01.pdf');
```

```matlab
source_root = "/Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-
project-520140154/Raw Data";
output_root = "/Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-
project-520140154";
organize_simple(source_root, output_root, 16000);
```

```
[strings] 11 files found
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/guitar/strings
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/bass/strings_b
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/cello/strings_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/guitar/strings
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/guitar/strings
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/cello/strings_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/viola/strings_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/viola/strings_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/viola/strings_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/violin/strings
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/strings/violin/strings

[percussion] 15 files found
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/drum/percus
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/conga/percu
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/conga/percu
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/cymbal/per
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/cymbal/per
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/drum/percus
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/drum/percus
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/drum/percus
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/drum/percus
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/drum/percus
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/tambourine/
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/tambourine/
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/tambourine/
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/timpani/per
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/percussion/timpani/per

[winds] 19 files found
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/clarinet/winds_c
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/clarinet/winds_c
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/flute/winds_flut
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/flute/winds_flut
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/flute/winds_flut
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/saxophone/winds_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/saxophone/winds_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/saxophone/winds_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/saxophone/winds_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trombone/winds_t
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trombone/winds_t
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trombone/winds_t
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trombone/winds_t
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trombone/winds_t
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trumpet/winds_tr
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trumpet/winds_tr
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trumpet/winds_tr
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trumpet/winds_tr
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/winds/trumpet/winds_tr

[keyboards] 12 files found
```

```
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/synth/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/synth/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/synth/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/harpsichord/
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/harpsichord/
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/harpsichord/
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/organ/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/organ/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/piano/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/piano/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/piano/keyboa
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/keyboards/synth/keyboa

[voice] 11 files found
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/sing/voice_sing_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/spoken/voice_spo
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/hum/voice_hum_00
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/sing/voice_sing_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/spoken/voice_spo
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/spoken/voice_spo
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/hum/voice_hum_00
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/hum/voice_hum_00
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/sing/voice_sing_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/sing/voice_sing_
→ /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data/voice/spoken/voice_spo

All done. Output at: /Users/dghifari/02-University/SEM-2-2025/ELEC5305/elec5305-project-520140154/Data
```

```matlab
function organize_simple(sourceRoot, outputRoot, targetFs)
if nargin < 3 || isempty(targetFs), targetFs = 16000; end
if ~isfolder(outputRoot), mkdir(outputRoot); end
families = ["strings","percussion","winds","keyboards","voice"];
keywordMap = struct( ...
    "strings",    ["violin","viola","cello","guitar","bass"], ...
    "percussion",
["drum","cymbal","tambourine","conga","congas","timpani","timp"], ...
    "winds",
["flute","clarinet","saxophone","sax","trumpet","trombone"], ...
    "keyboards", ["piano","organ","synthesizer","synth","harpsichord"], ...
    "voice",
["voice","vocal","sing","singer","singing","hum","humming","speech","spoken"
,"word","vox"] ...
);
for f = families
    srcFam = fullfile(sourceRoot, f);
    if ~isfolder(srcFam), warning("Missing family folder (skipped): %s",
srcFam); continue; end
    files = [dir(fullfile(srcFam, '*.wav')); dir(fullfile(srcFam,
'*.mp3'))];
    fprintf("\n[%s] %d files found\n", f, numel(files));
    for k = 1:numel(files)
        src = fullfile(files(k).folder, files(k).name);
        [~, baseName, ext] = fileparts(src);
        ext = lower(ext);
```

```matlab
            try
                [x, fs] = audioread(src);
            catch ME
                warning("Failed to read %s (%s).", src, ME.message); continue;
            end
            if size(x,2) > 1, x = mean(x,2); end
            if fs ~= targetFs, x = resample(x, targetFs, fs); end
            instr = guessInstrument(lower(baseName), string(f), keywordMap);
            if instr == "", instr = "misc"; end
            instr = sanitize(instr);
            dstDir = fullfile(outputRoot, "Data", string(f), instr);
            if ~isfolder(dstDir), mkdir(dstDir); end
            idx = nextIndex(dstDir, string(f), instr);
            dstName = sprintf("%s_%s_%03d.wav", string(f), instr, idx);
            dst = fullfile(dstDir, dstName);
            try
                audiowrite(dst, x, targetFs);
                fprintf("→ %s\n", dst);
            catch ME
                warning("Failed to write %s (%s).", dst, ME.message);
            end
        end
    end
end
fprintf("\nAll done. Output at: %s\n", fullfile(outputRoot, "Data"));
end

function instr = guessInstrument(nameLower, family, keywordMap)
lst = keywordMap.(char(family));
instr = "";
for i = 1:numel(lst)
    if contains(nameLower, lower(lst(i)))
        instr = lst(i);
        return;
    end
end
end

function tok = sanitize(tok)
tok = lower(tok);
tok = regexprep(tok, '[^a-z0-9]+', '_');
tok = regexprep(tok, '^_+|_+$', '');
if isempty(tok), tok = "misc"; end
end

function idx = nextIndex(dstDir, family, instr)
files = dir(fullfile(dstDir, sprintf('%s_%s_*.wav', family, instr)));
pat = sprintf('^%s_%s_(\\d{3})\\.wav$', family, instr);
mx = 0;
for i = 1:numel(files)
    t = regexp(files(i).name, pat, 'tokens', 'once');
```

```
        if ~isempty(t)
            v = str2double(t{1});
            if ~isnan(v) && v > mx, mx = v; end
        end
    end
    idx = mx + 1;
end
```