When Do We Use 'and', 'or', or 'xor'?

Assume that there are two 10 x 1 arrays (column vectors) and contain mideterm and final scores for 10 students. Student id is assigned to 1 to 10 in order. Write a script to compute the problems.

mid_score = $\begin{bmatrix} 71 \\ 82 \\ 85 \\ 76 \\ 91 \\ 100 \\ 82 \\ 83 \\ 65 \\ 51 \end{bmatrix}$, final_score = $\begin{bmatrix} 81 \\ 90 \\ 65 \\ 52 \\ 51 \\ 99 \\ 81 \\ 66 \\ 55 \\ 53 \end{bmatrix}$

```
mid_score = [71 82 85 76 91 100 82 83 65 51]';
final_score = [81 90 65 52 51 99 81 66 55 53]';
```

1. Find id(s) of students whose scores are more than and equal to 80 and less than 90 in their midterm.

```
% and(log_vec1,log_vec2) equivalent to log_vec1 & log_vec2
% or(log_vec1, log_vec2) equivalent to log_vec1 | log_vec2
cond1 = (mid_score>=80);
cond2 = (mid_score<90);

st_logi_mid = and(cond1, cond2);
% note: and(v1, v2)

st_id1 = find(st_logi_mid)
```

2. Find id(s) of students whose score are more than and equal to 80 and less than 90 in either mideterm or final.

```
cond3 = (final_score>=80);
cond4 = (final_score<90);

st_logi_final = and(cond3, cond4); % determine if final_score is >=80 and <90.
st_logi_2 = or(st_logi_mid, st_logi_final);
% uses st_logi_mid found in 1.
st_id2 = find(st_logi_2)
```

3. Let's assme that students fail an exam if their scores are less than 60. Find id(s) of students who fail only one exam.

```
cond_fail_mid = (mid_score<60);
cond_fail_final = (final_score<60);
```

```
st_logi_3 = xor(cond_fail_mid, cond_fail_final)
st_id3 = find(st_logi_3)
```