IDENTIFICATION OF **IMPORTANT PLACES** IN SOURCE CODE BY **EYE TRACKING** PROGRAMMERS

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STUDENT

- ☆ Is trying to solve a problem
- ☆ Can't solve the problem
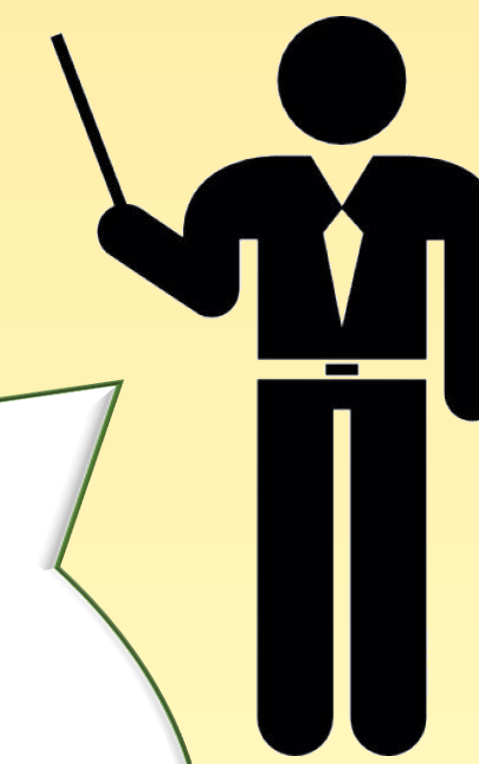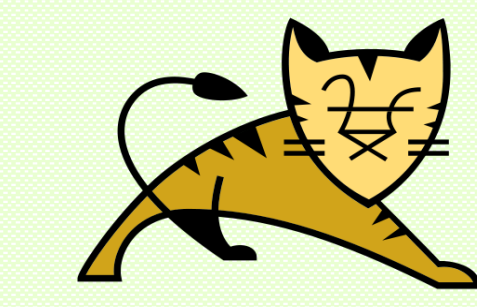- ☆ leaves the code
- ☆ Is sad

TEACHER

- ☆ Looks at student's code
- ☆ Does not understand the student
- ☆ Can't help the student
- ☆ Is sad

```
         LINE 10
    int getLine(void)
  {
6     int c, i;
7     for(i = 0; i < MAXLINE && (c = getchar(
8         line[i] = c;
9
10    line[i] = '\0';
11    if(c == '\n')
         ++i;
      return i;
```
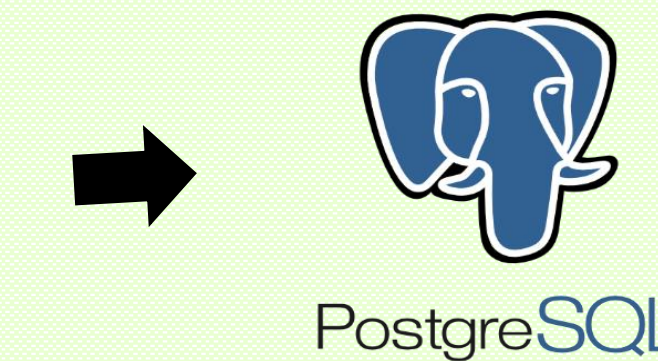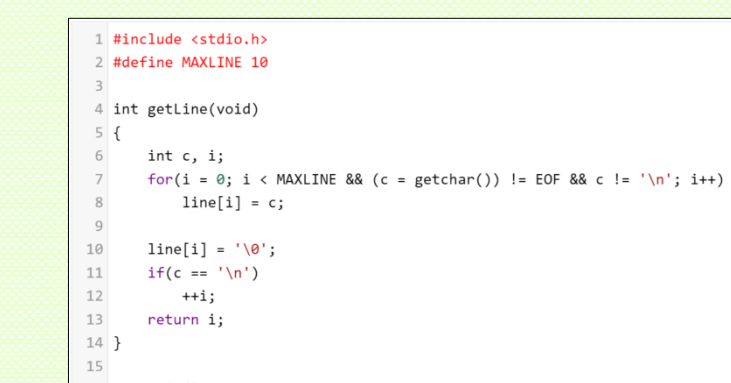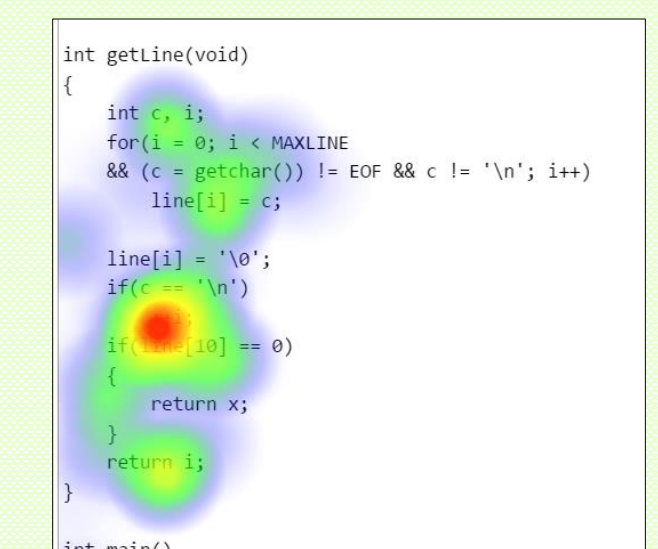
```
    getLine(void)
  {
6     日文漢字 是書寫日
7     文時 所使 用的
8     漢字
9     。日文 漢字的 寫法 基本
10    上與中
      文使用的
      漢字 大 同 小異。
```

@Tracking programmer **during** programming
@Recording **changes** in editor
@Recording **scrolling**
@Heat map generation for every **compilation**
@Two possible configurations

@Tracking programmer's gaze
@Sending data to database
@Generating heat maps
@Identifying important places

Important places – places that a programmer focused the most

Used technology

Tobii EyeX – eye tracker tracking participant's gaze

CodeMirror – web editor which is able to track changes and scrolling

GazeHook – providing eye tracker data

Heatmap.js – JavaScript framework which is able to generate heat maps

Experiments

1. Reading static source code (Tobii Studio)
2. Editing source code (our algorithm)

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```
#include <stdio.h>
#define MAXLINE 10

int getLine(void)
{
    int c, i;
    for(i = 0; i < MAXLINE
    && (c = getchar()) != EOF && c != '\n'; i++)
        line[i] = c;

    line[i] = '\0';
    if(c == '\n')

    if(       [10] == 0)
    {
        return x;
    }
    return i;
}

int main()
{
    return 0;
}
```

STUDENT

- ☆ Now can solve the problem
- ☆ Is happy

TEACHER

- ☆ Looks at the student's heat maps
- ☆ Now understands the student's progress
- ☆ Can help the student
- ☆ Is happy