Building WordCloud Program Step-by-Step

In your **Processing** folder, create a subfolder called ***WCInc***.

WCInc01

Open ***Processing*** and immediately save the sketch to the ***WCInc*** folder as **WCInc01**. Create two global **PFont** variables: **fontImpact** and **fontMistral**. Use **createFont**() to initialize these variables with the Windows system fonts ***Impact*** and ***Mistral***. Set the size of the window to 600W x 400H.

Write a method called **bgTrans**(), in which you draw the window's background using a transparent red. Use a global **final color** variable called **RED_T** to do this. The transparency value should be 12. Call **bgTrans**() in **draw**().

WCInc02

1. Create a class called **PWord**. Write a constructor with no body and no parameters. Write 2 class methods: **write1**() and **write2**().

2. **write1**() will use the **Impact** font. It will display the word "**Again**" so that its baseline is at the middle of the window's left edge. The size of the font should be **48**, the color should be **white**, and the word should display **LEFT** aligned.

3. **write2**() will use the **Mistral** font. It will display the word "**Zipline**" in the middle of the window's bottom edge. The size of the font should be **64**, the color should be **yellow**, and the word should display **CENTER** aligned.

To figure out how to specify the exact value for the vertical position so that the **descender** of the "p" is visible, look up the method **textDescent**().

4. Create two global **PWord** variables: **word1** and **word2**. Initialize each with a **new** **PWord** object in **setup**(). Use **word1** and **word2** in **draw**() to display both words.

WCInc03

Create **7** class variables.

A **PFont** variable called **font**.
A **String** variable called **word**.
An **int** variable called **size**.
Two **float** variables called **x** and **y**.
A **color** variable called **clr**.
An **int** variable called **align**.

Write a method called **write**() – modeled after **write1**() and **write2**() – that uses these 7 class variables ***instead of*** the hard-coded values that those two methods use.

Create a third global **PWord** variable: **word3**. Initialize it with a **new** **PWord** object.
Then – also in **setup**() – use the **word3** variable with ***dot syntax*** to initialize each of its 7 class variables with values that will display the word "**Elephant**" in blue so that its baseline is at the middle of the right border, **RIGHT** aligned, using the font ***Rage Italic***, text size 80.

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WCInc04

In **setup**(), declare/create 7 **local** variables corresponding to the 7 **class** variables in **PWord**. They will have the same names as the class variables, with the addition of an ending: "**Value**", e.g. **fontValue**, **wordValue**, etc.

Initialize these 7 variables with the values you had assigned directly to the class variables in WCInc03, e.g. **sizeValue = 80**. Then substitute these local variables for the hard-coded values. Below is the complete example for **alignValue**:

```
// keep all of the local variable declaration/initialization statements together
int alignValue = RIGHT;

// keep all of the class variable initialization statements together
word3.align = alignValue;
```

There will be no difference from **WCInc03** when you run the program.

WCInc05

In**PWord**, make a duplicate copy of the constructor, but comment it out (you will use it later on).

From **setup**(), **cut/delete**the 14 lines of code that you made changes to in **WCInc04**, and paste it into the **PWord** constructor. Replace the 7 instances of **word3** with **this**.

There will be no difference from **WCInc03/04** when you run the program.

WCInc06

In**PWord**, ***promote*** all 7 local variables to parameters, **ONE AT A TIME** as follows:

1. Change each local variable name by replacing its ending "**Value**" with "**PassIn**",
e.g. **font**Value becomes **font**PassIn.

2. Move the **left side** of the declaration/initialization in between the parentheses. Then move the right side (value) of the declaration/initialization to the constructor in **setup**(). Below is how your final code should look for the font parameter:

// in **PWord.pde**

```
PWord(PFont fontPassIn) {
this.font = fontPassIn;
}
```

// in **WCInc06.pde**

```
word3 = new PWord(fontRage);
```

3. Comment the second constructor back in (i.e. remove the comment-out slashes).
When done, you will have **TWO** constructors, one with no parameters and one with 7 parameters.

There will be no difference from **WCInc03/04/05** when you run the program.

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WCInc07

1.Add the line below to **write2**() as its last line:

```
println( textDescent() );
```

Run the program and note the **value** of **textDescent**().

2. In **setup()**, initialize **word1** and **word2** with the **PWord** constructor that uses 7 parameters. Both words will display exactly as before (using the same color, size, font, position, etc.) Note that **textDescent**() no longer returns the correct value. **Replace it** with the number value you found above in (1).

3. Delete the 2 methods **write1**() and **write2**(). The program now contains two bugs in **draw**(). Fix these so both words display.

There will be no difference from **WCInc03/04/05/06** when you run the program.

WCInc08

In **PWord**, modify **write**() so that it can draw a word at any angle. In the main module, draw **word2** at a 90 degree angle, align = **RIGHT**. The **textDescent() value** is no longer needed for "**Zipline**": Remove it!

WCInc09

1. In **PWord**, write a (void) method named **placeRandomlyOnEdge**(). In the body of this new method, write an **if-else** statement with **FOUR (4) BRANCHES**. The condition for each branch (what's inside the parentheses) should figure out on which edge the word is positioned. It should then adjust one of the coordinates so that the word will appear **randomly anywhere** on **that same edge** each time the program starts up.

2. Call/Use this method at the bottom of the body of the constructor (i.e. as its very last statement).

Below are 3 examples of how the window might appear when the program starts up:

WCInc10

In **placeRandomlyOnEdge**(), notice that the bodies of the 4 branches of the if-else statement contain duplicate statements. 2 branches contain identical statements; the other 2 branches do too.

Modify **placeRandomlyOnEdge**() so that its **if-else** statement has only **TWO BRANCHES**. You do this for each pair of duplicate branches by (a) eliminating one of the duplicate branches, but (b) **combining both conditions** into a **COMPOUND boolean** expression (one that uses **AND** (`&&`) or **OR** (`||`)). Figure out whether you should use `&&` or `||`.

There will be no difference from **WCInc09** when you run the program.

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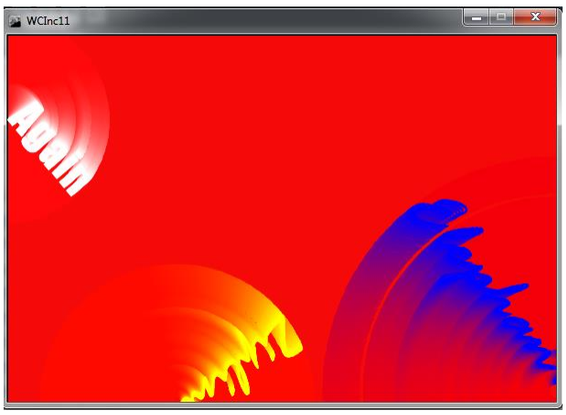
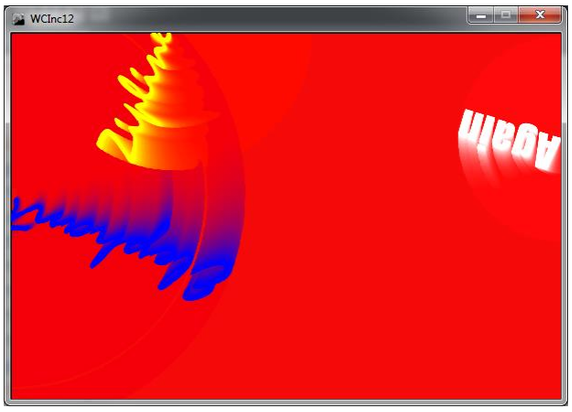
WCInc11



In **PWord**, modify **write**() so that each word will spin clockwise at the rate **of one complete revolution EVERY 12 SECONDS**. Remember that the default **frameRate** is 60 frames/second and that there are 360º in a circle.

WCInc12



1. In **PWord**, create two more class variables. They will be called **xOpp** and **yOpp** and they will be of type float, like **x** and **y**.

2. Write a method called **calcOppositeEdge**() that will calculate the corresponding point on the opposite edge,

   For example:

   If a word were on the **TOP** edge, **xOpp** and **yOpp** would be the coordinates of the point on the **BOTTOM** edge directly below it, so that if you were to draw a line between the two points, it would be vertical.

   If a word were on the **LEFT** edge, **xOpp** and **yOpp** would be the coordinates of the point on the **RIGHT** edge directly across from it, so that if you were to draw a line between the two points, it would be horizontal.

3. Call/Use this method at the bottom of the body of the constructor (i.e. as its very last statement).

4. Modify write() so that it uses **xOpp** and **yOpp** instead of **x** and **y**.

WCInc13

Modify **write**() as follows:

Each word will travel – still spinning – from its starting position at **(x,y)**, either horizontally or vertically, across the window to the opposite edge at **(xOpp, yOpp)**, and **then beyond without stopping**. The travel time to reach the opposite edge should be **3 SECONDS**.

Use **TWO** time variables (of type **float**): **timeReal** and **time**.
timeReal will be calculated directly from **frameCount** and the frame rate (60.0).
time is the variable that will be used in the expressions for calculating a word's position.
Depending upon what you will be doing in this and the subsequent programs, **time** may or may not have the same value as **timeReal**.

WCInc14

Modify **write**() as follows:

No change to each word as it travels across the window.
However, once each word reaches the opposite edge, it will stop and remain there, continuing to spin in place.

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WCInc15

Modify **write**() as follows:

As each word travels across the window, **it will stop at the halfway point between the edges for 3 SECONDS**. It will then continue to the opposite edge.

Once a word reaches the opposite edge, the animation will repeat. That is, the word will immediately appear at the starting edge and travel across the window again (and again), stopping at the halfway point.

WCInc16

Modify **write**() as follows:

Same behavior as **WCInc15**, except that once the word reaches the opposite edge, **it will bounce and move in the reverse direction**. When a word reaches the halfway point between the edges, regardless of which direction it is traveling, it will stop for 3 seconds.