

1.1

The intensity when  $\alpha * \text{mask} = 0$  should be the original, C, because the brush is completely blocked out or transparent, depending on which is 0. The intensity when  $\alpha * \text{mask} = 1$  should be B, because the brush writes over the original completely. When  $\alpha * \text{mask}$  varies between 0 and 1, the final intensity should vary between those two values linearly (lerping between B and C dependent on  $\alpha * M$ ), so:

$$F = \alpha MB + (1 - \alpha M)C$$

2.1

```
int rowstart = MAX(y - R, 0);  
int rowend = MIN(y + R + 1, h);  
int colstart = MAX(x - R, 0);  
int colend = MIN(x + R + 1, w);
```

3.1

```
index = row * width + col  
index = 22 * 512 + 242  
index = 11506
```

3.2

```
col = index % width  
col = 12345 % 512  
col = 57  
row = (index - col) / width  
row = (12345 - 57) / 512  
row = 24  
row = 24, col = 57
```

3.3

4 bytes; 1 byte for each channel of BGRA.

3.4

$4 * \text{width} = 2048$  bytes, because there are  $\text{width} - 1$  pixels stored between the two each with 4 bytes of data, plus the first pixel's data.