

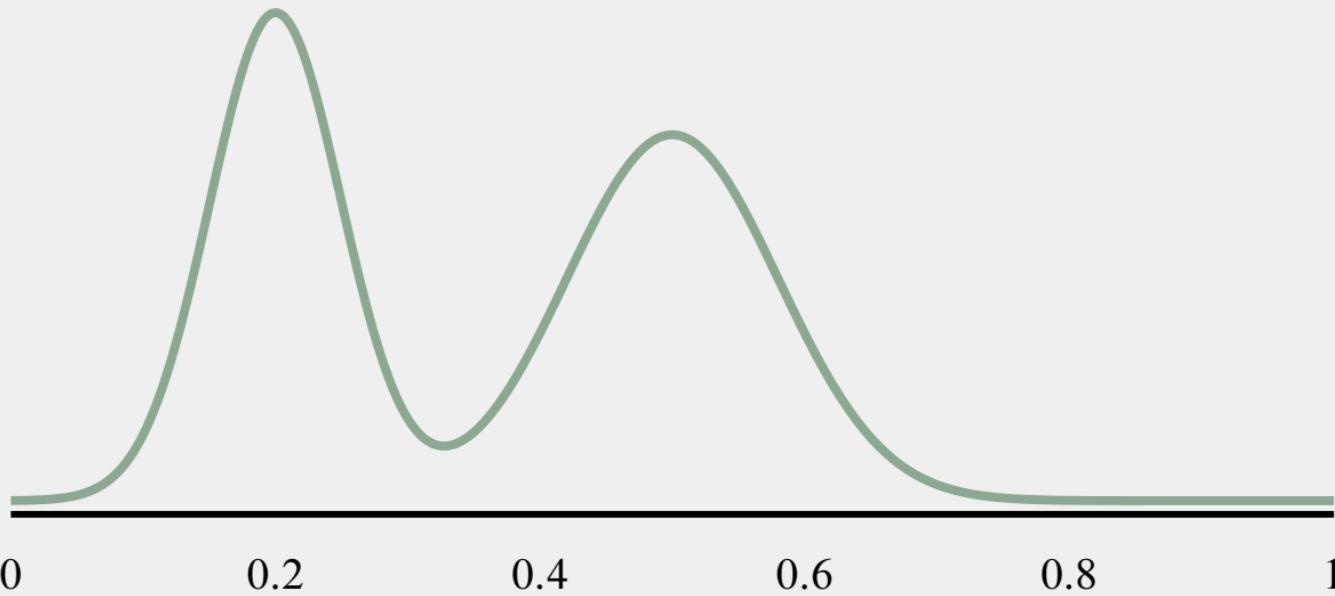
Physical conjugate(?) priors





GAUSSIAN MIXTURE

$$p(\psi \mid \Theta) = \sum_{i=1}^k w_i \mathcal{N}(\psi \mid \mu_i, \sigma_i^2)$$





$\mathcal{N} \Gamma^{-1}$ is a conjugate prior for
 \mathcal{N} with unknown mean and
variance.

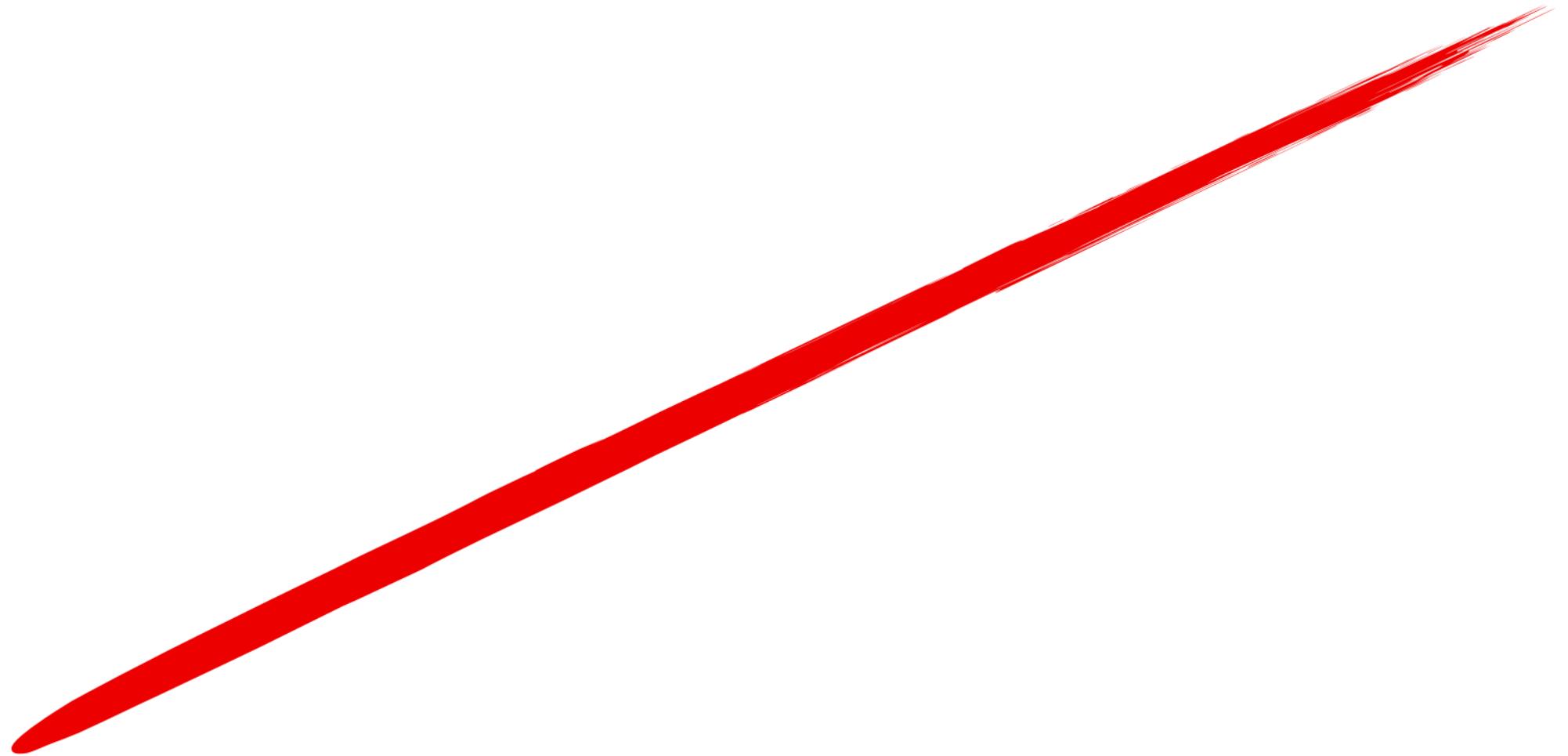
ДОКУМЕНТАЦИЯ
ПОДДЕРЖКА
СЕРВИСЫ

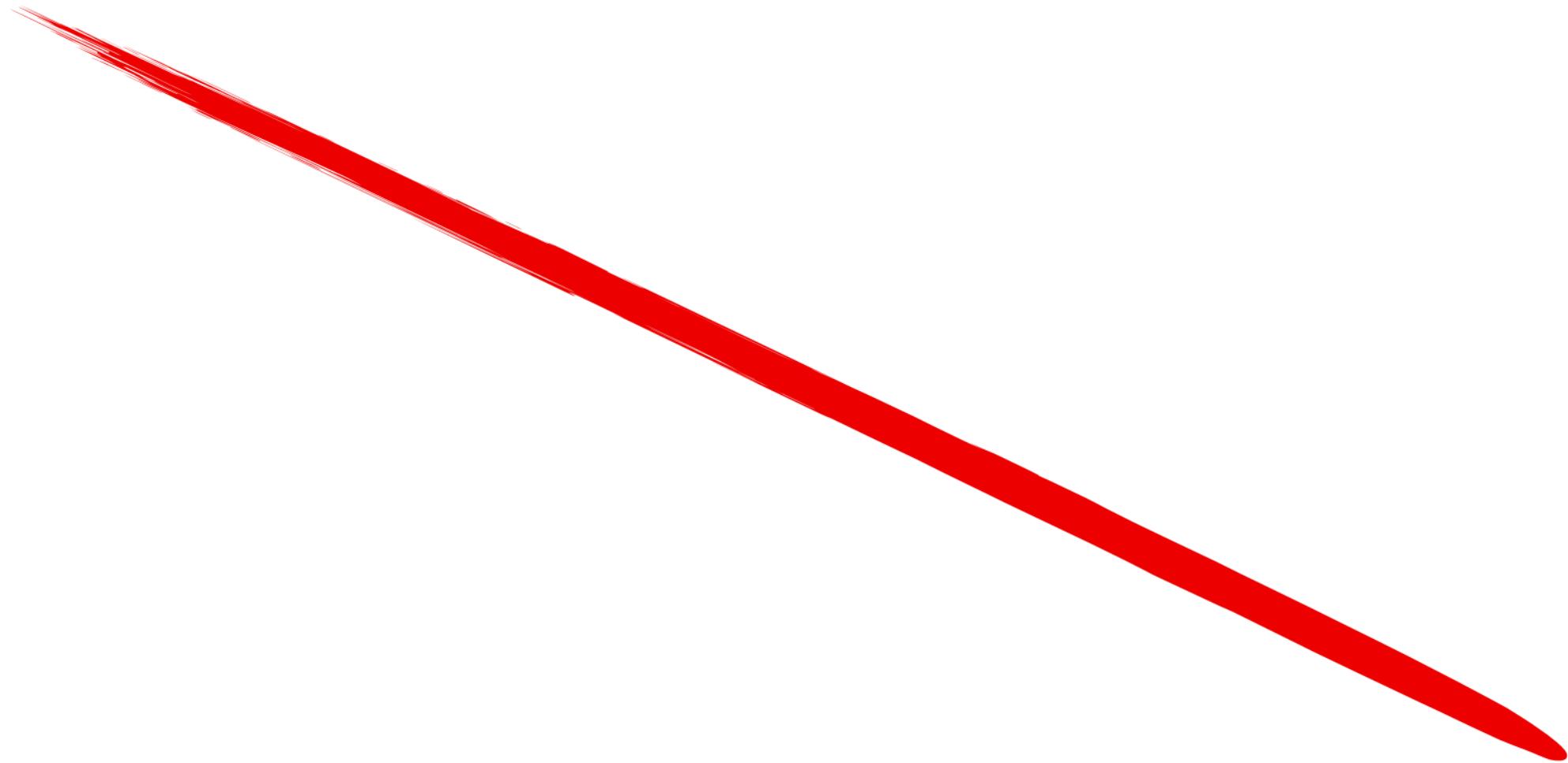
$$p(\Theta \mid \Psi) = \mathrm{Dir}(w \mid a).$$

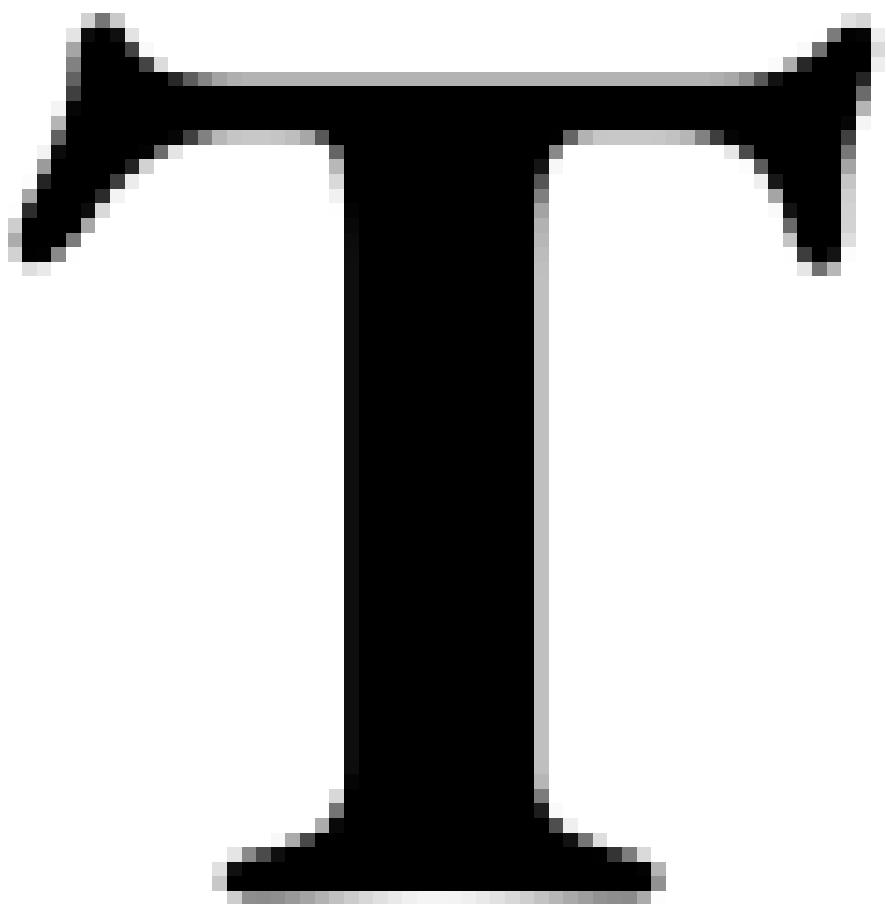
$$\prod_{i=1}^k\mathcal{N}\Gamma^{-1}\left(\mu_i,\sigma_i^2\mid\tau_i,\kappa_i,\beta_i,\gamma_i\right)$$

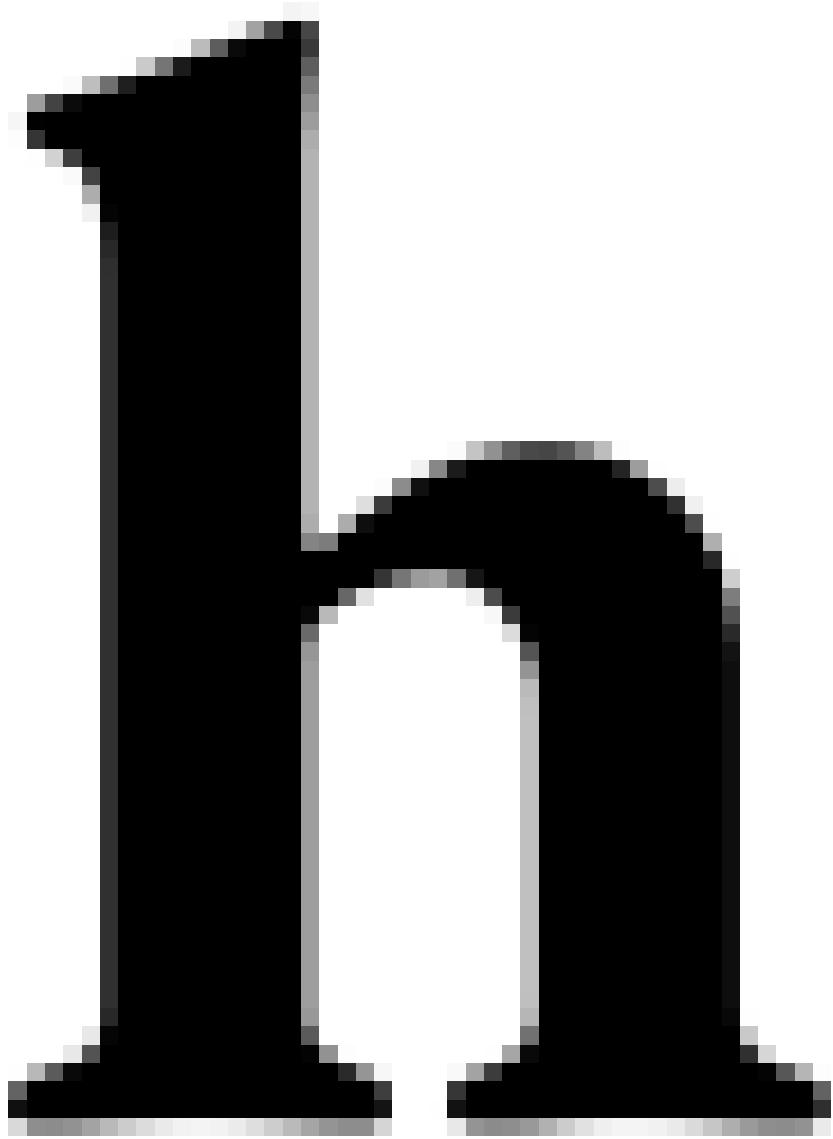
POSTERIOR (???)

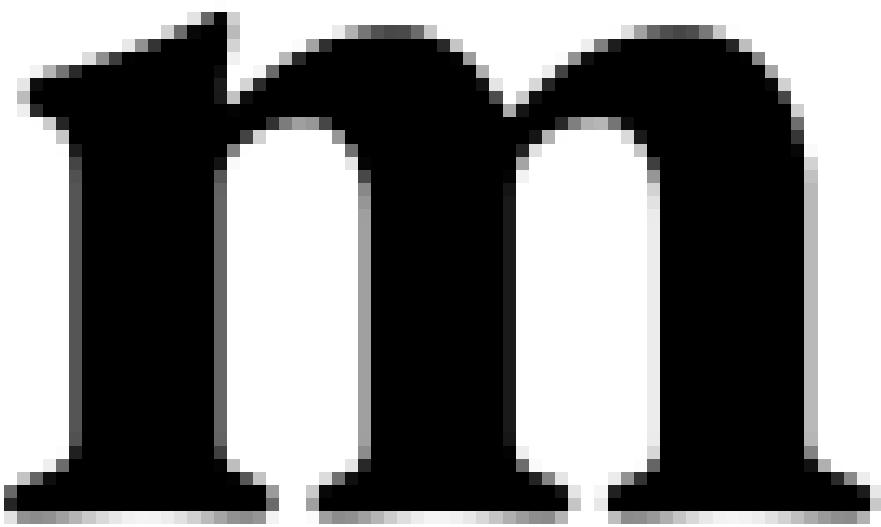
$$p(\Theta \mid \psi, \Psi) = \frac{1}{M} \left[\sum_{j=1}^k c_j \operatorname{Dir}(\boldsymbol{w} \mid \tilde{\boldsymbol{a}}_j) \cdot \mathcal{N}\Gamma^{-1} \left(\mu_j, \sigma_j^2 \mid \tilde{\tau}_j, \tilde{\kappa}_j, \tilde{\beta}_j, \tilde{\gamma}_j \right) \cdot \prod_{\substack{i=1 \\ i \neq j}}^k \mathcal{N}\Gamma^{-1} \left(\mu_i, \sigma_i^2 \mid \tau_i, \kappa_i, \beta_i, \gamma_i \right) \right]$$



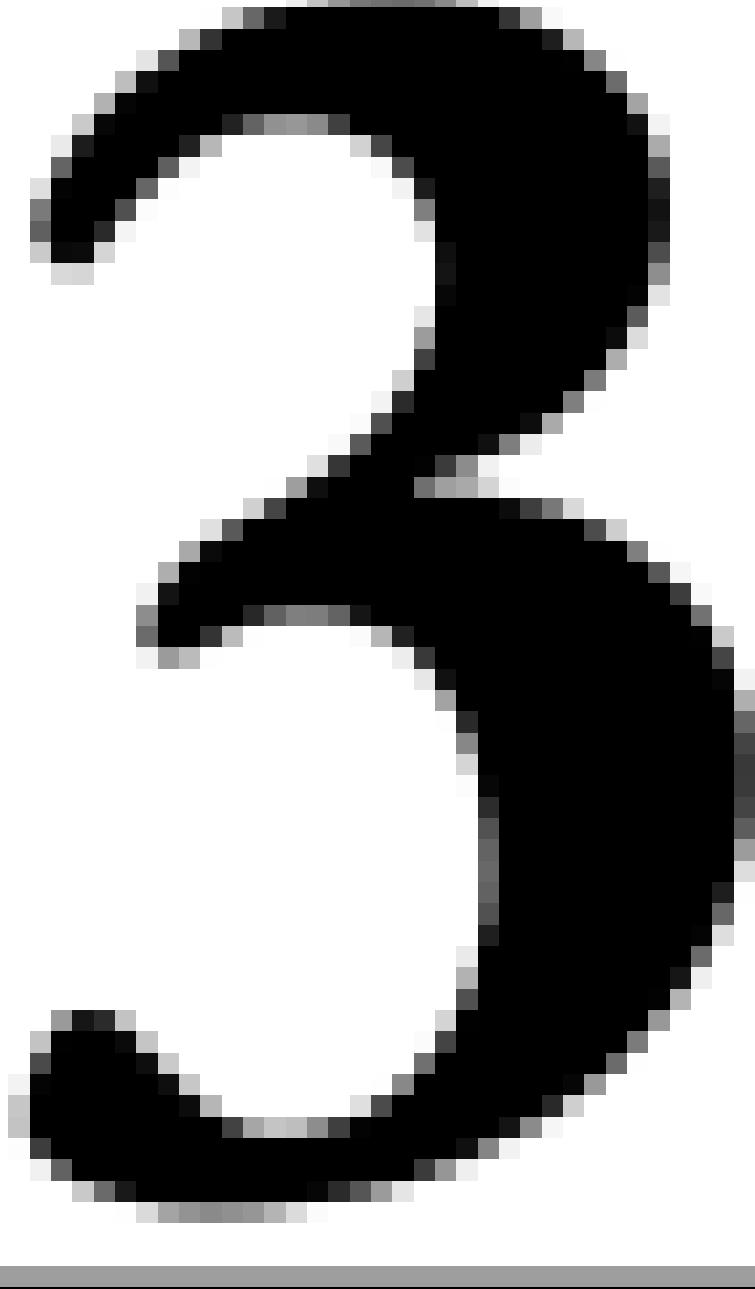


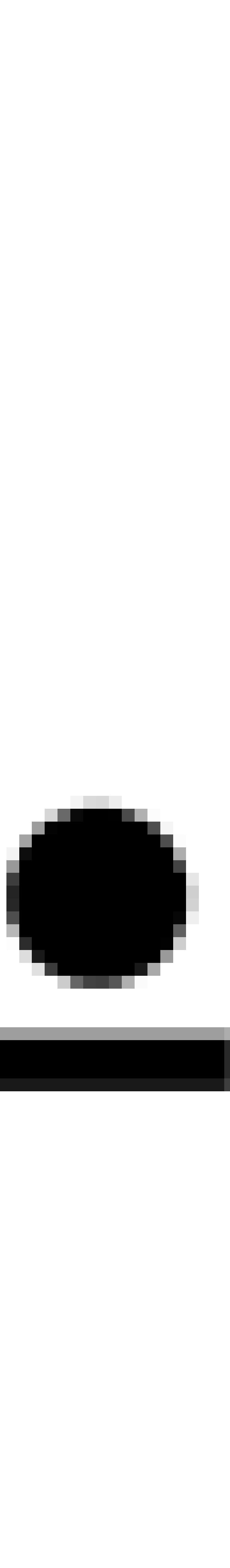


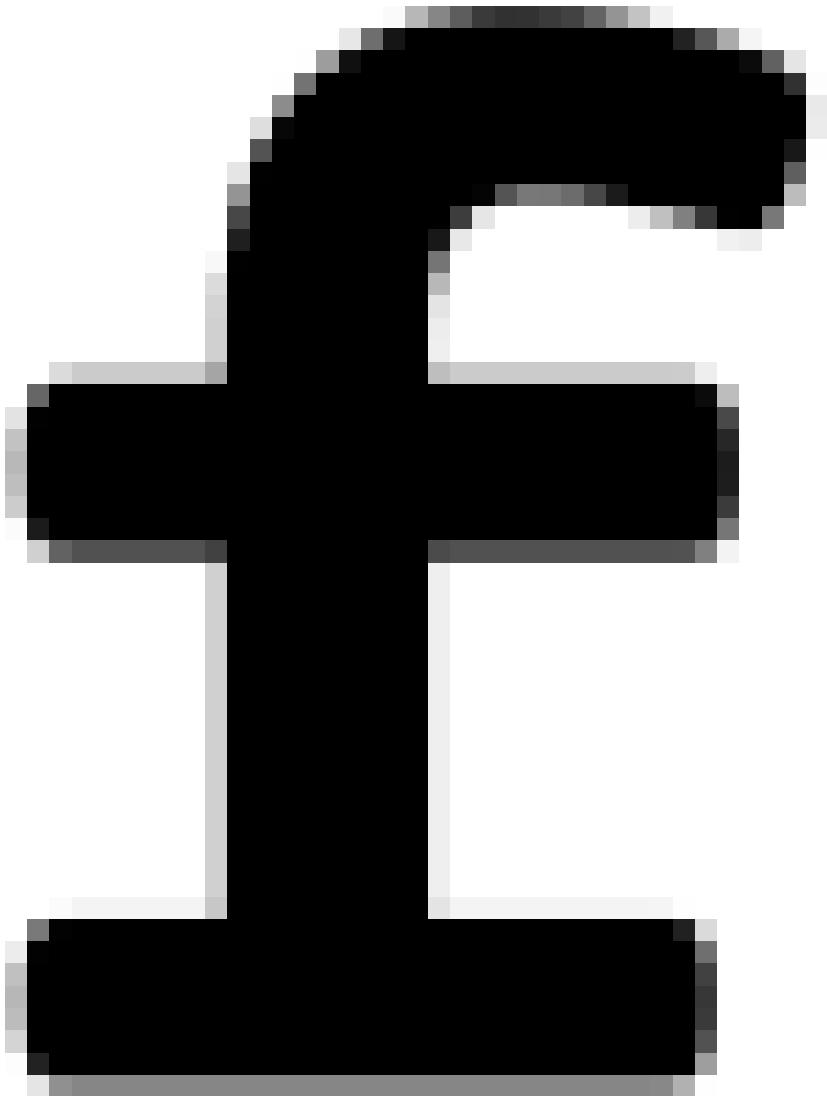




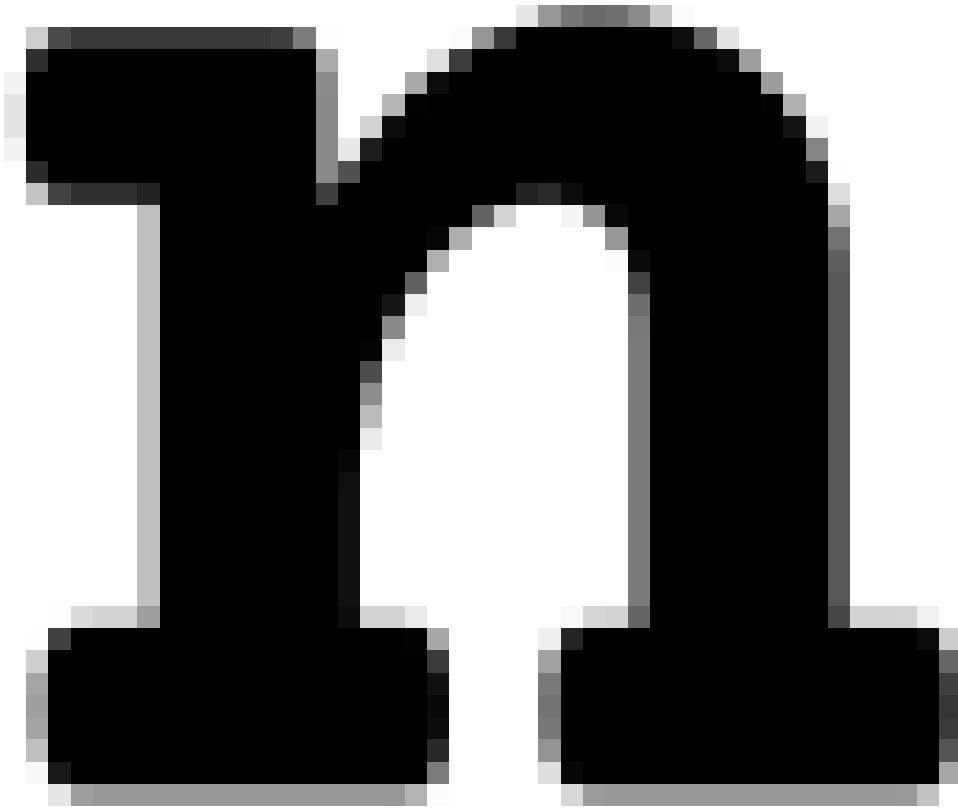


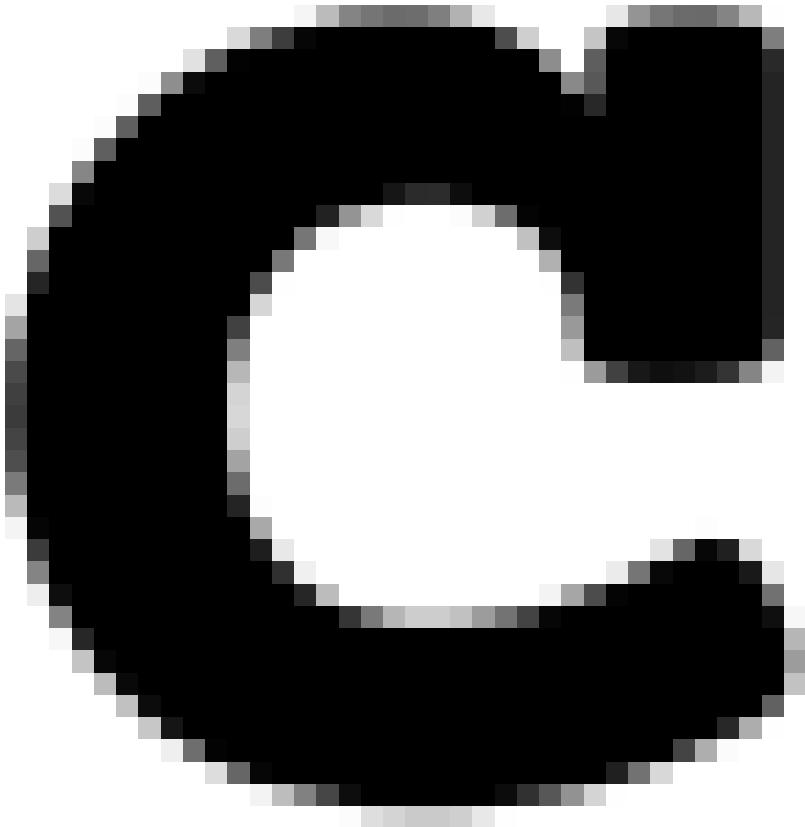


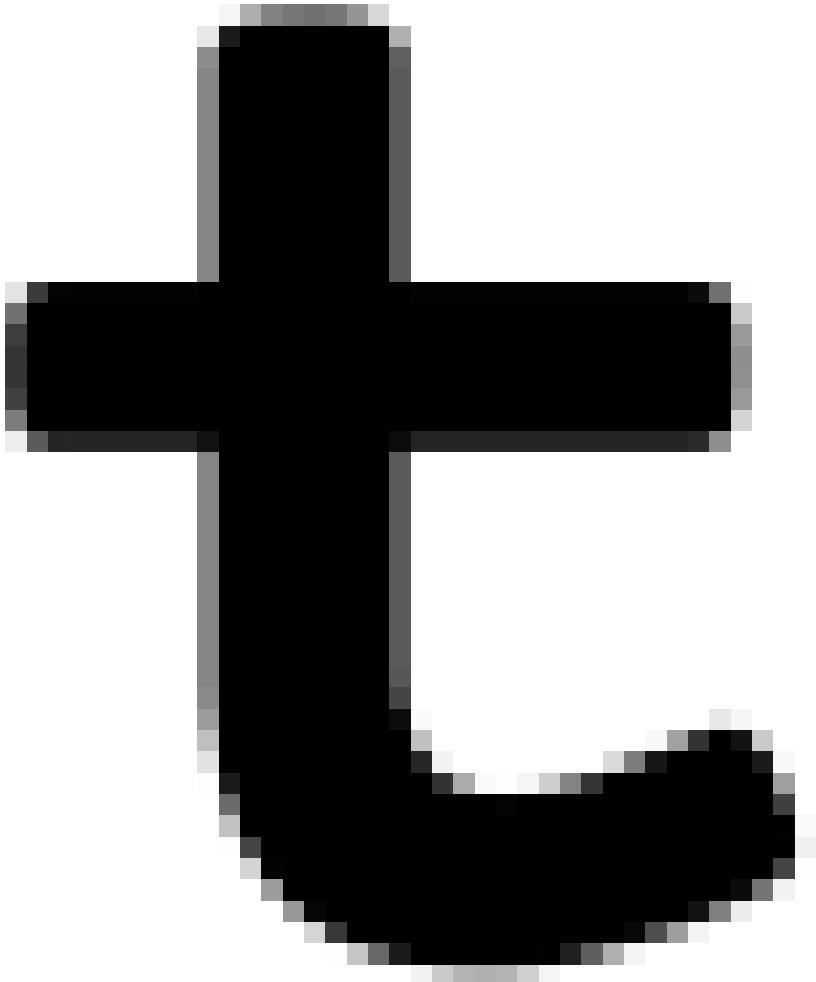


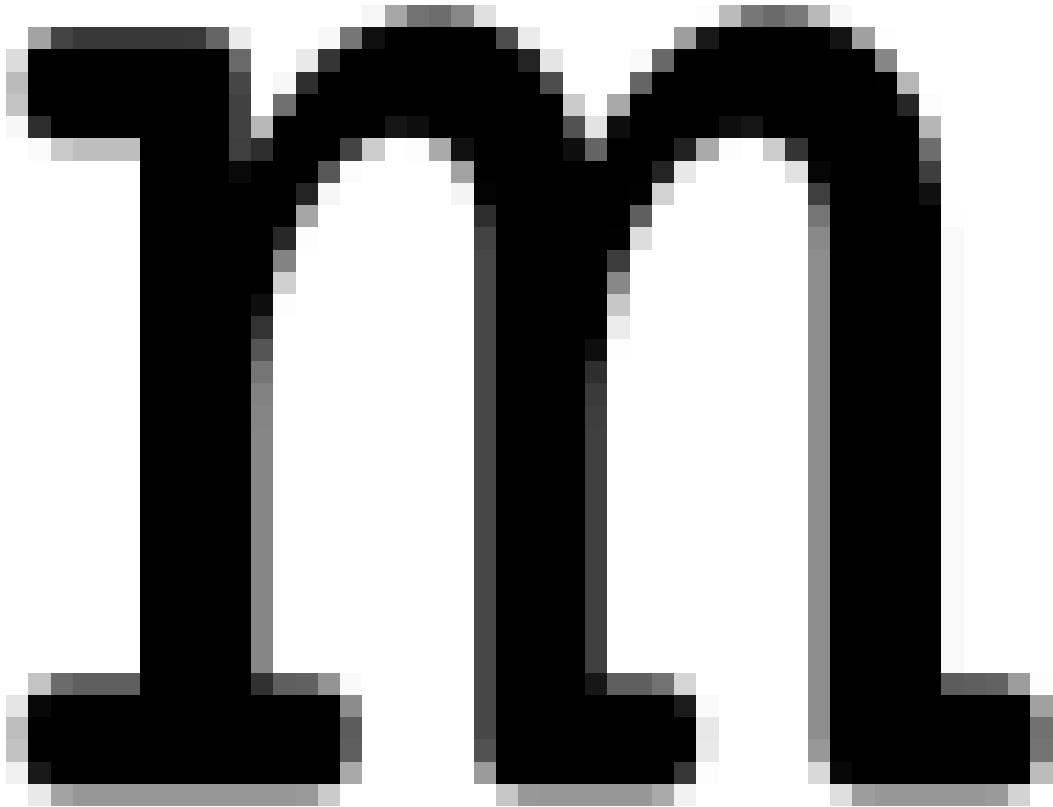


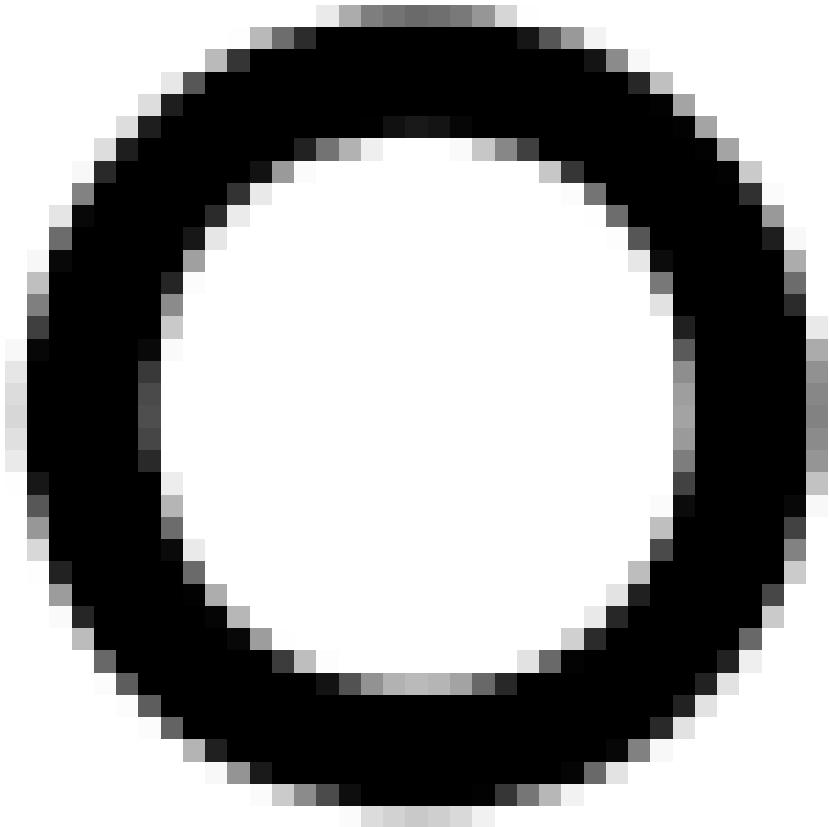


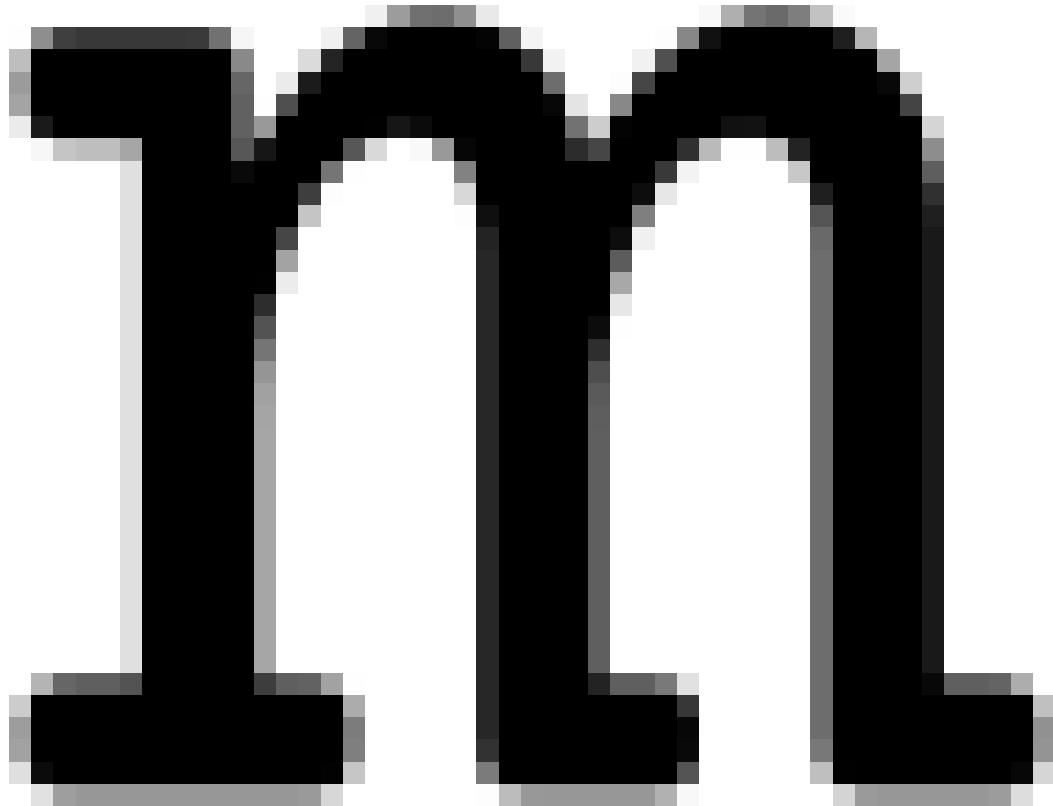


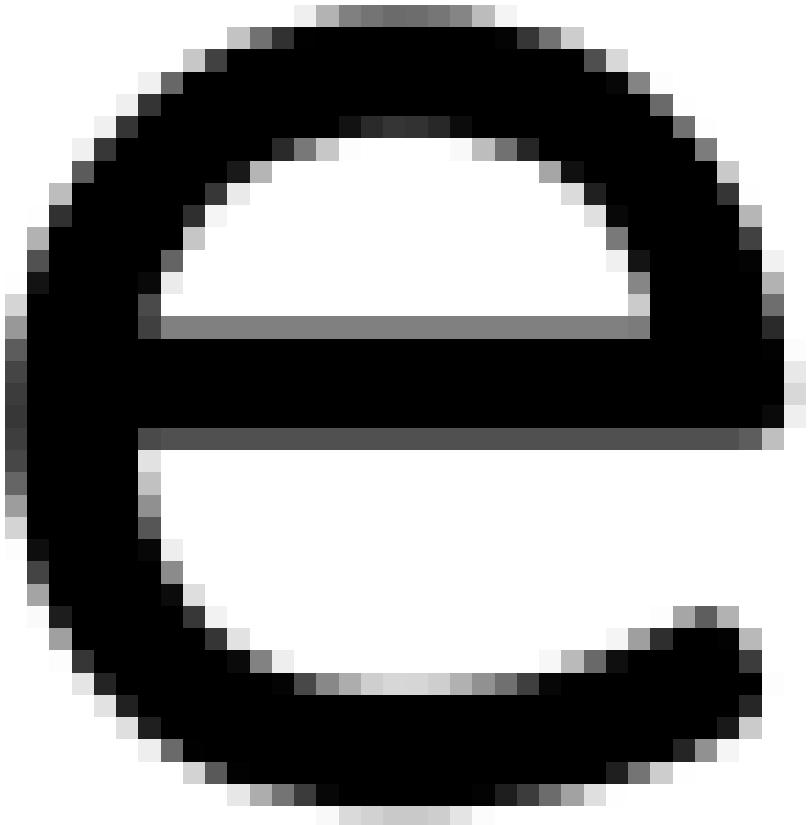


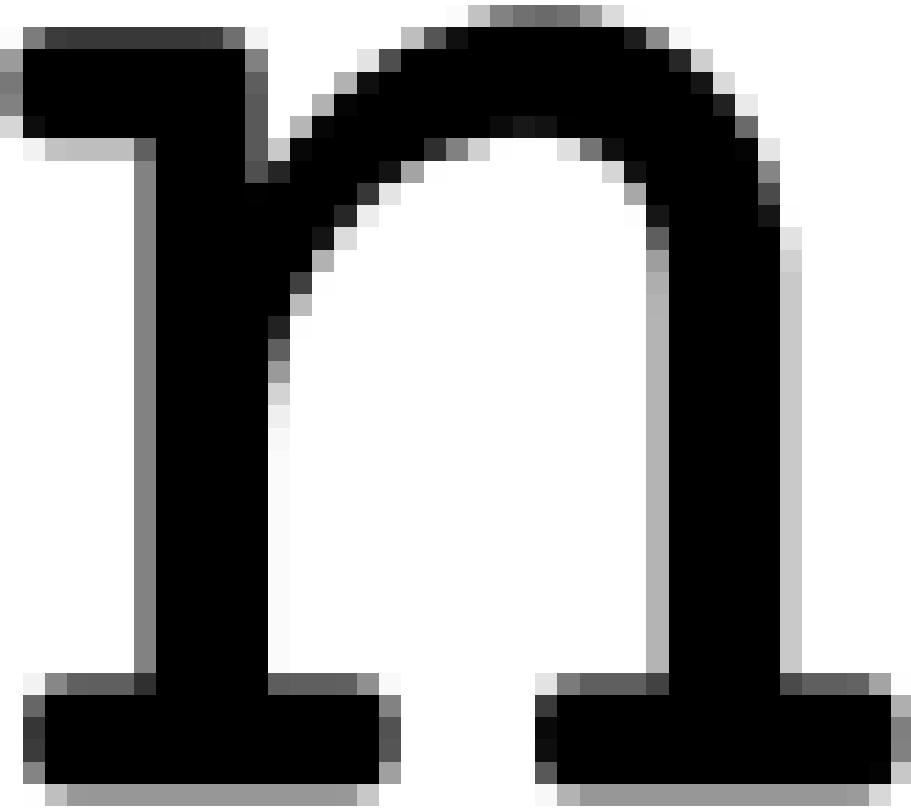


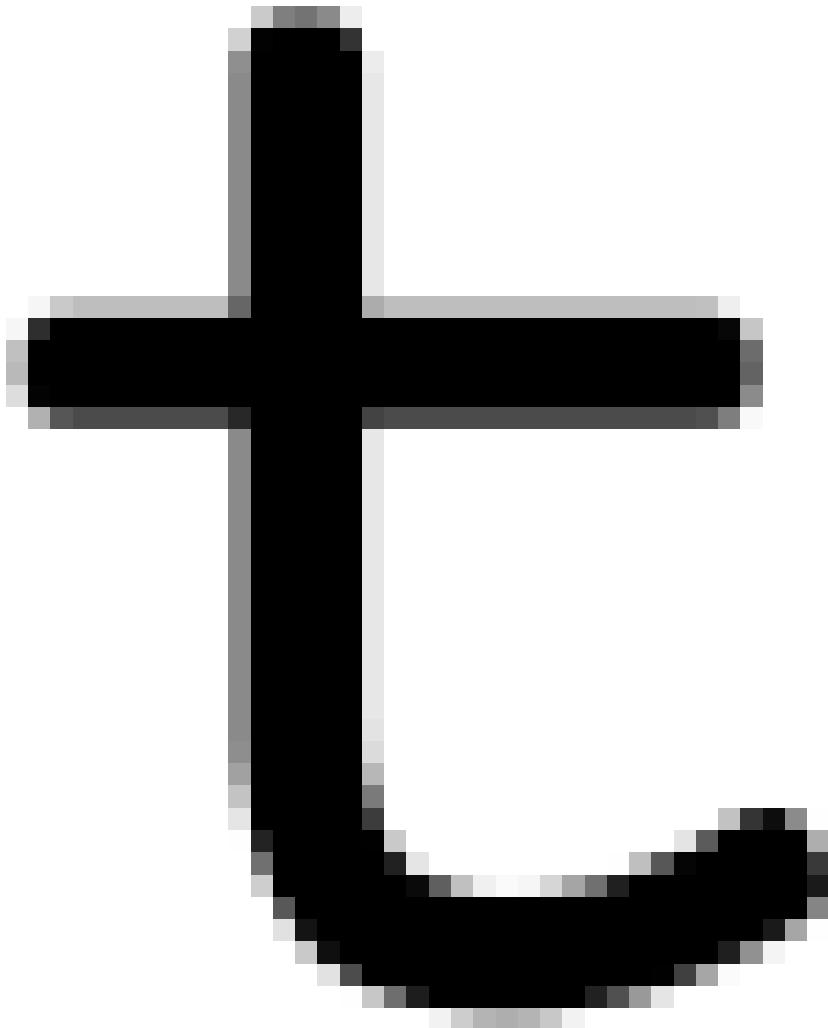


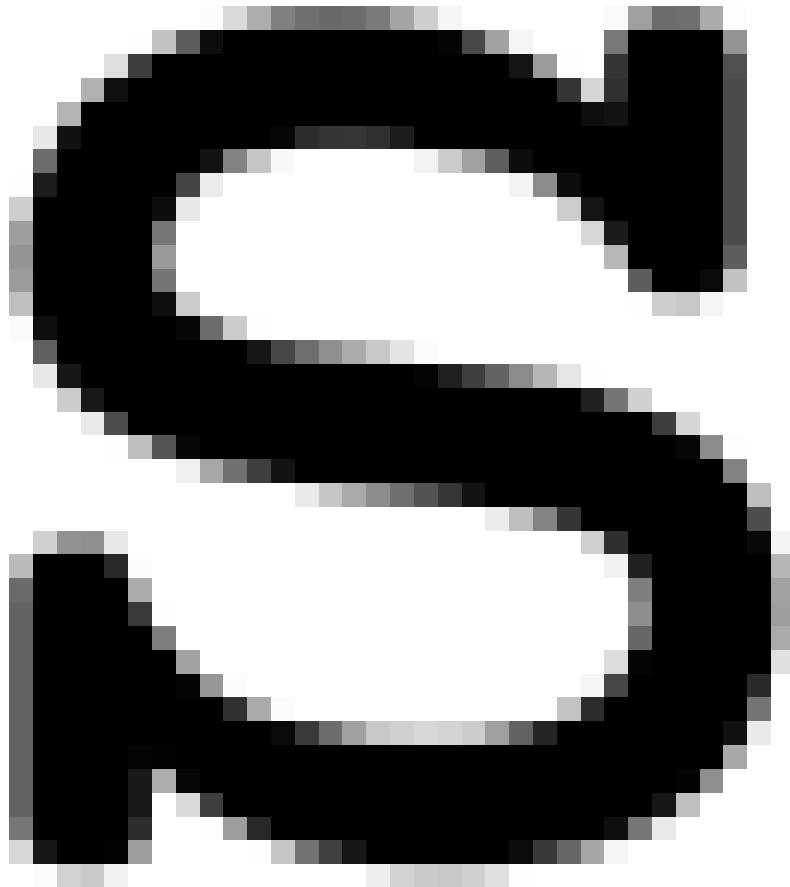


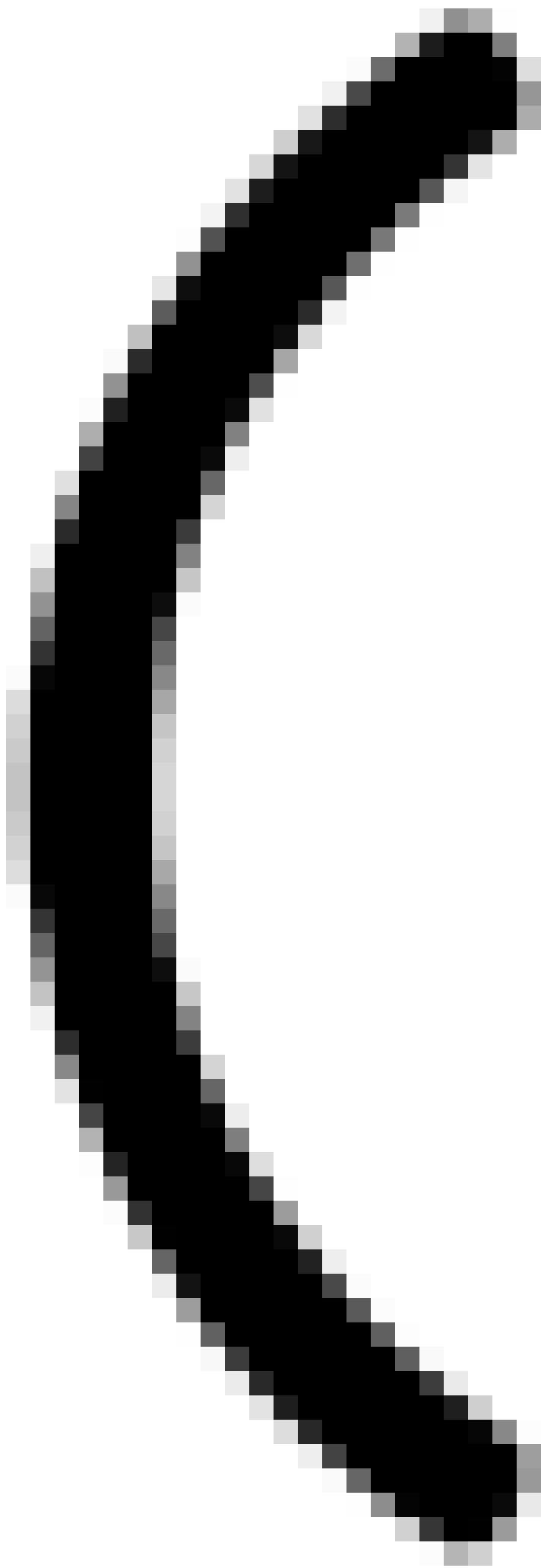


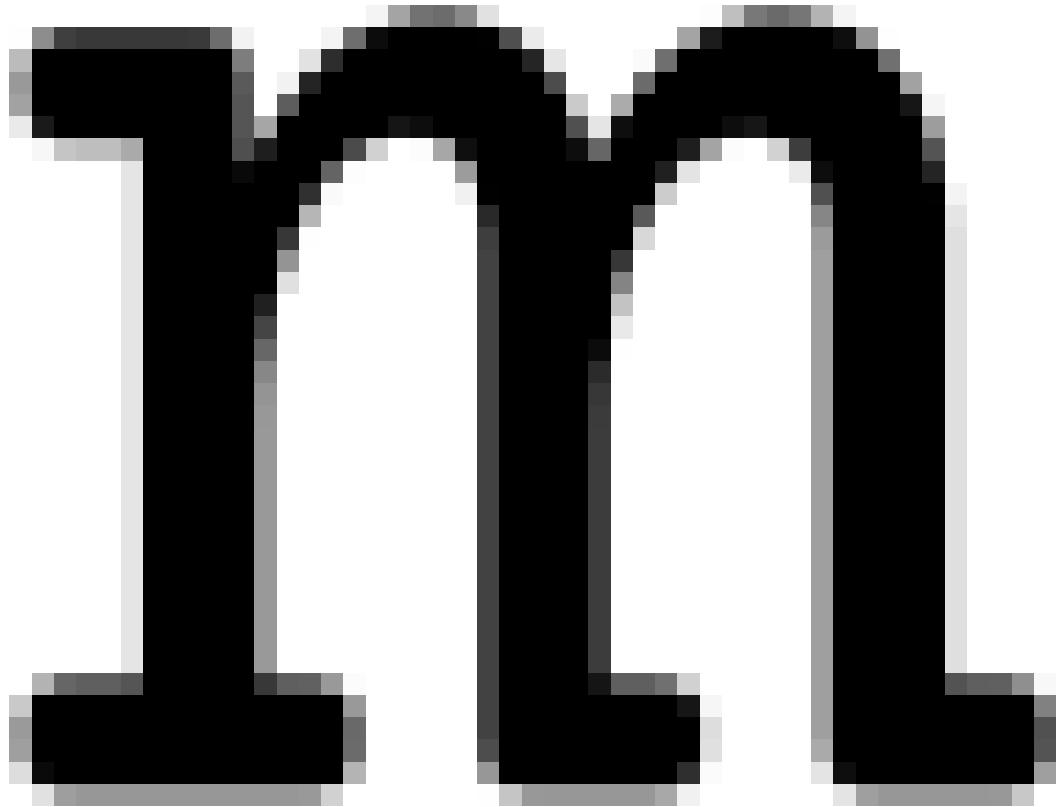


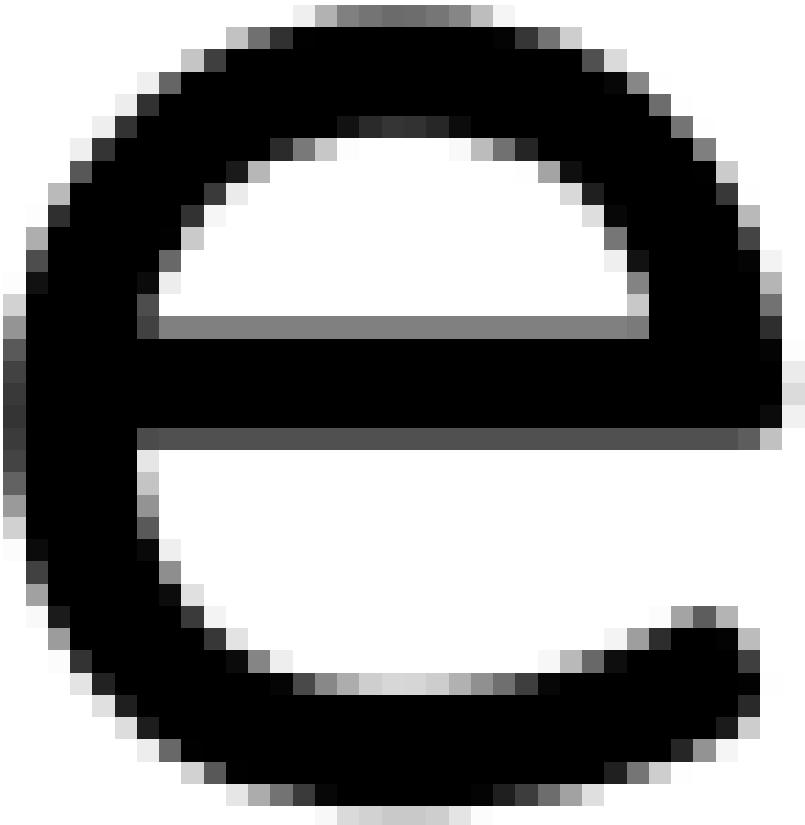




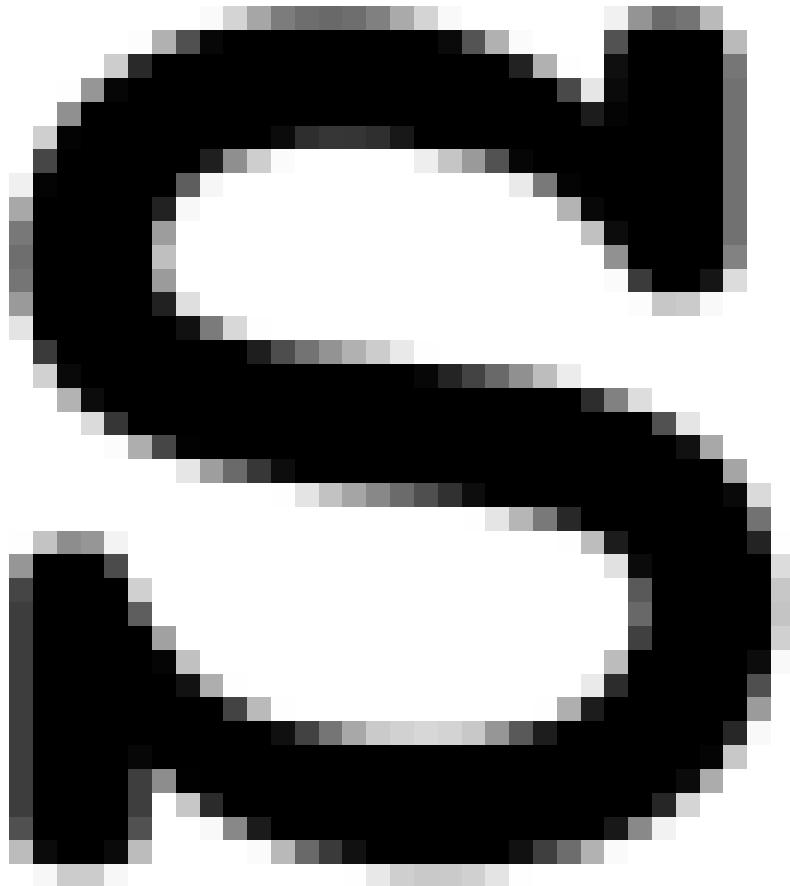




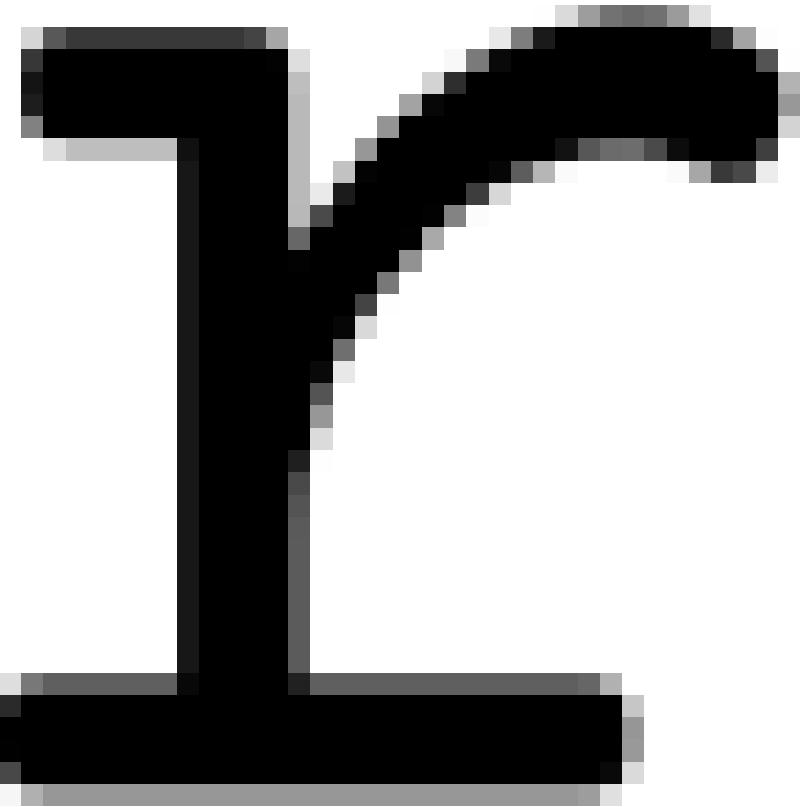


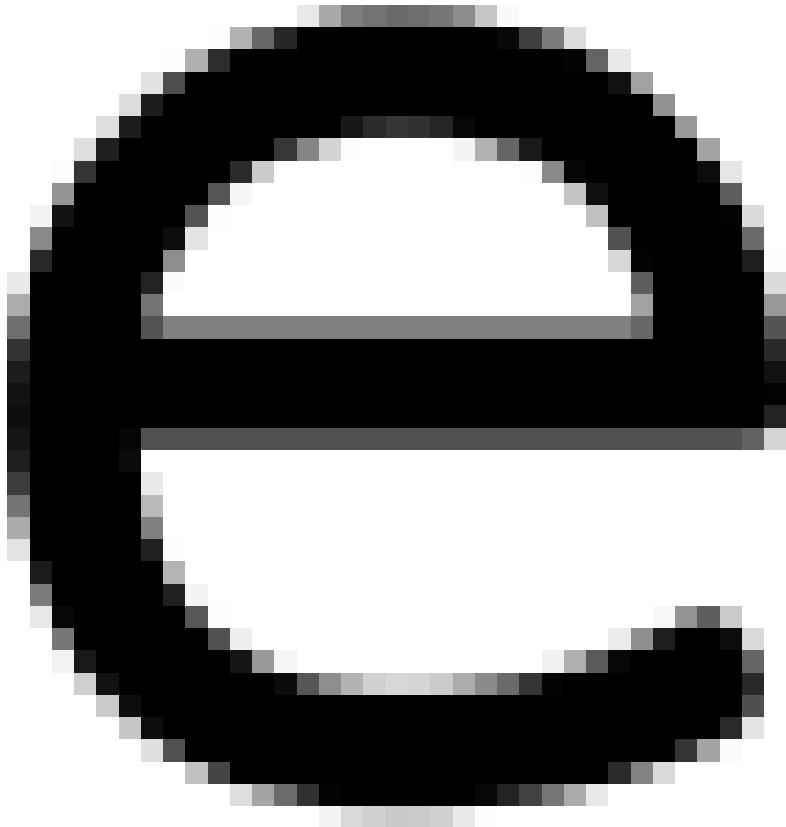


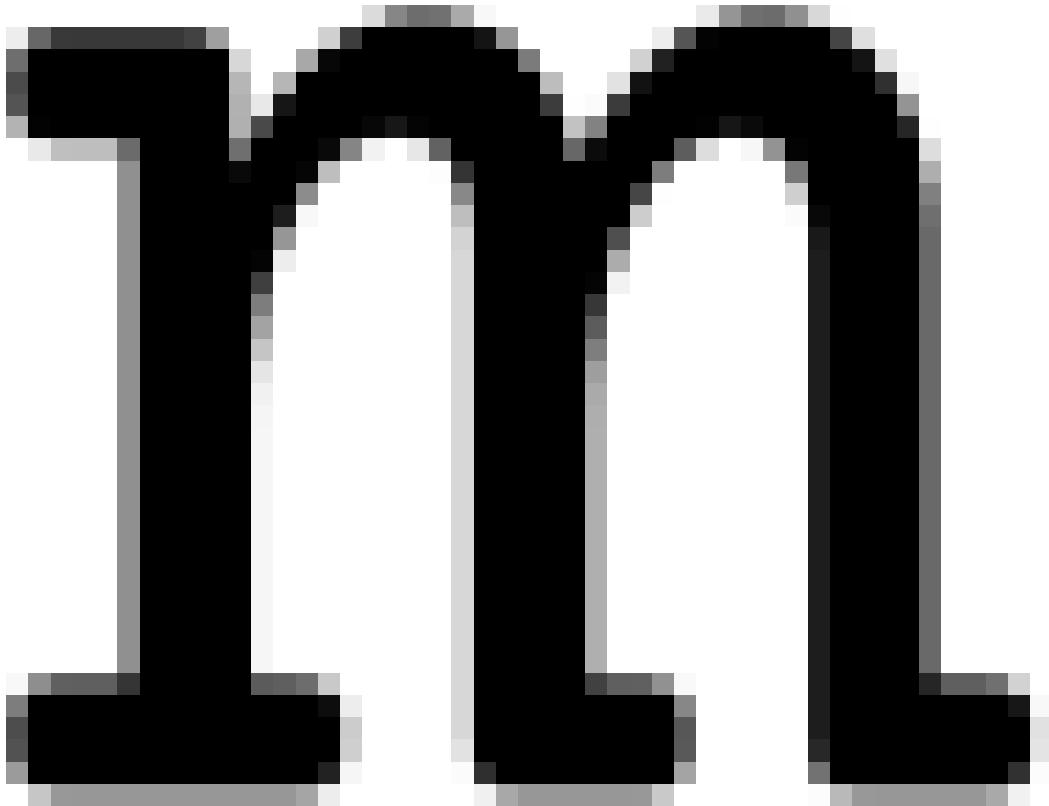


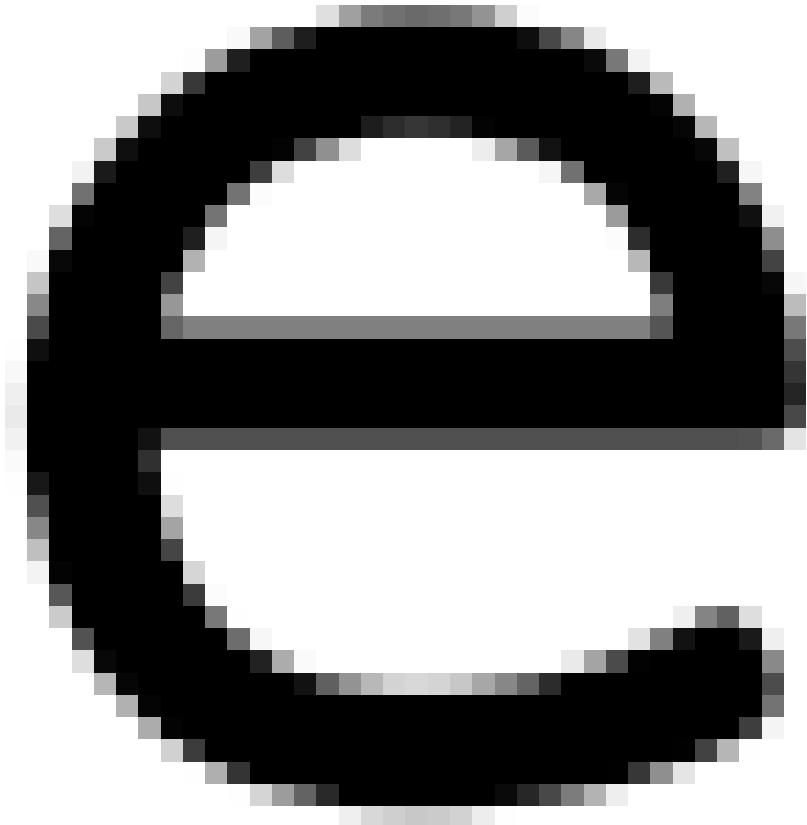


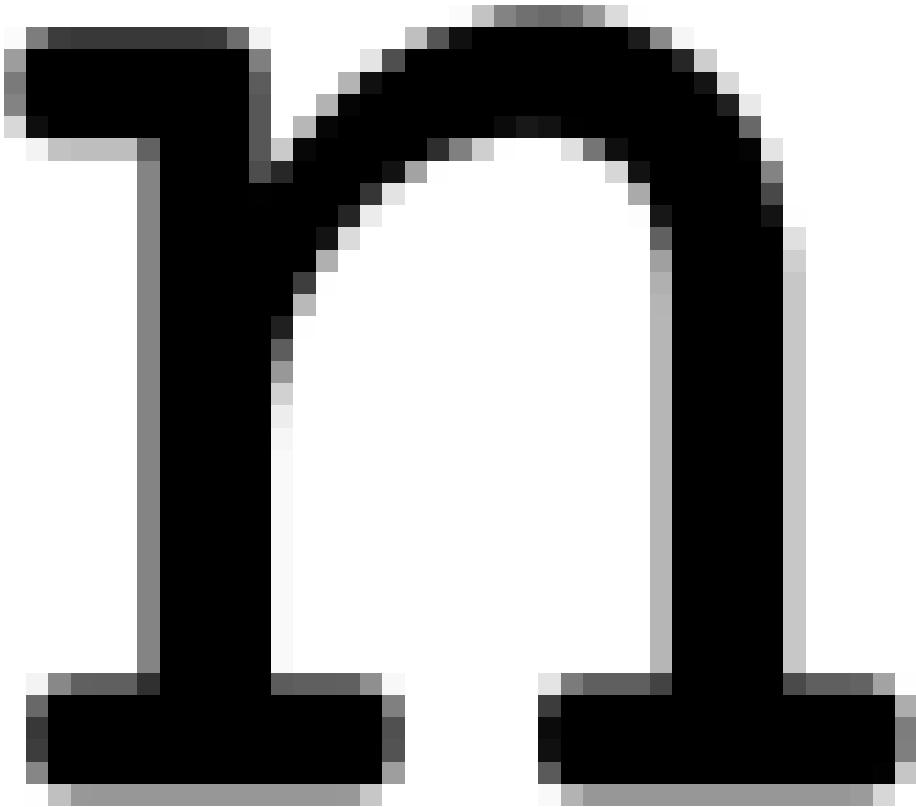


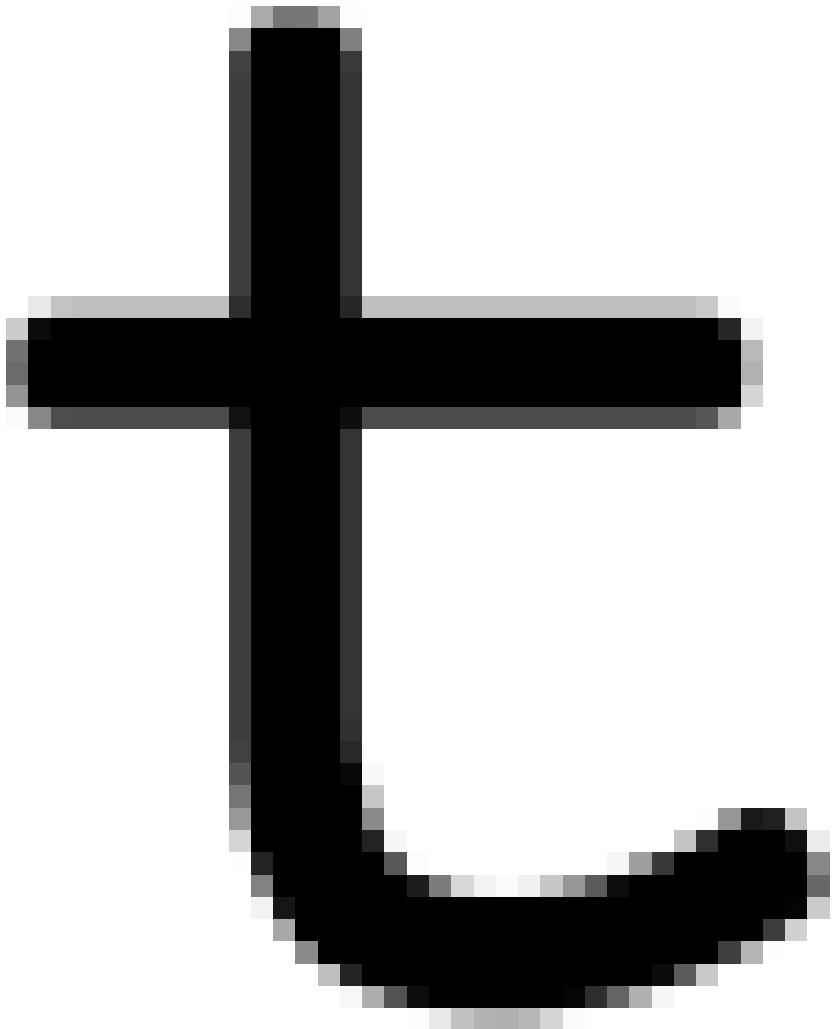


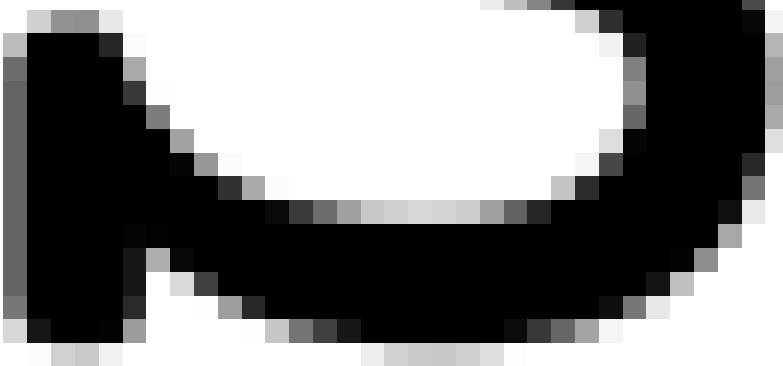
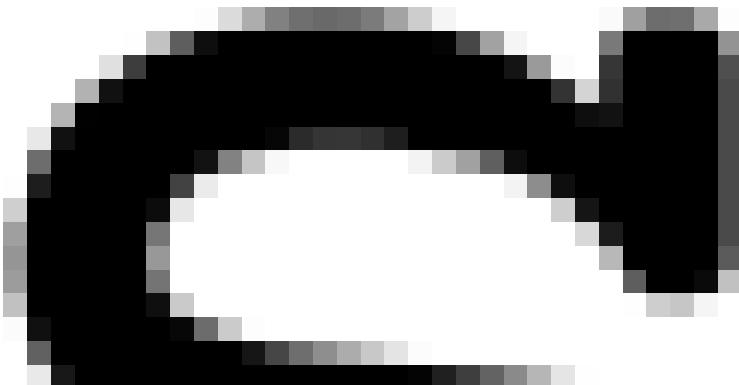


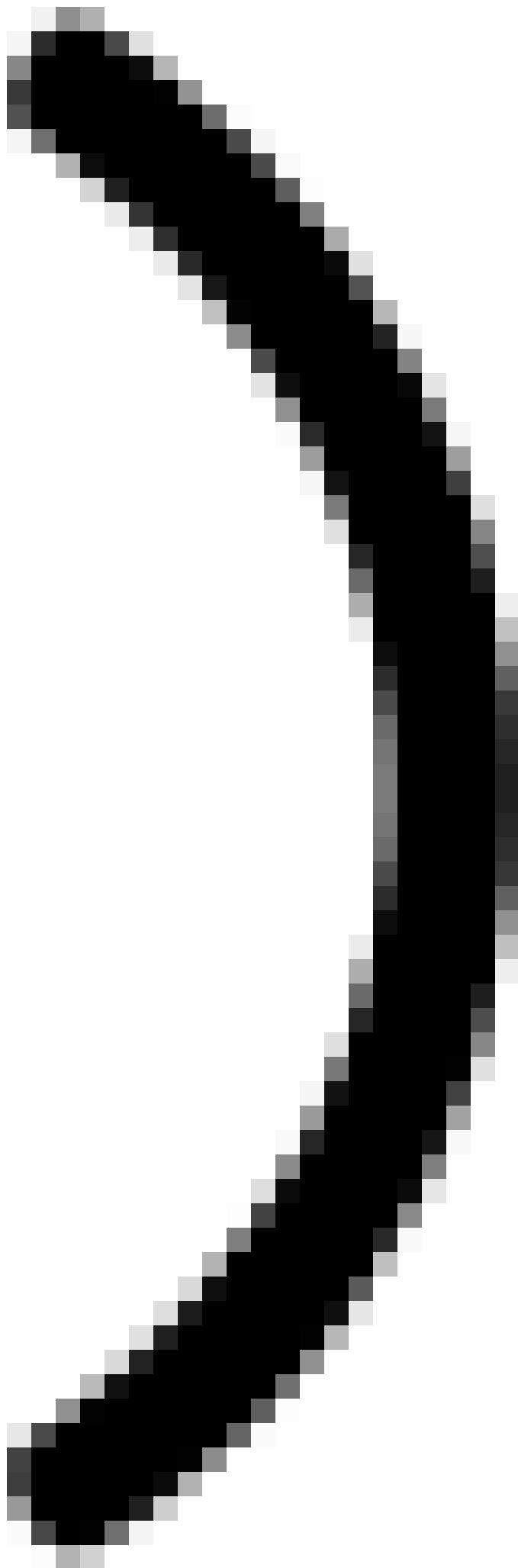


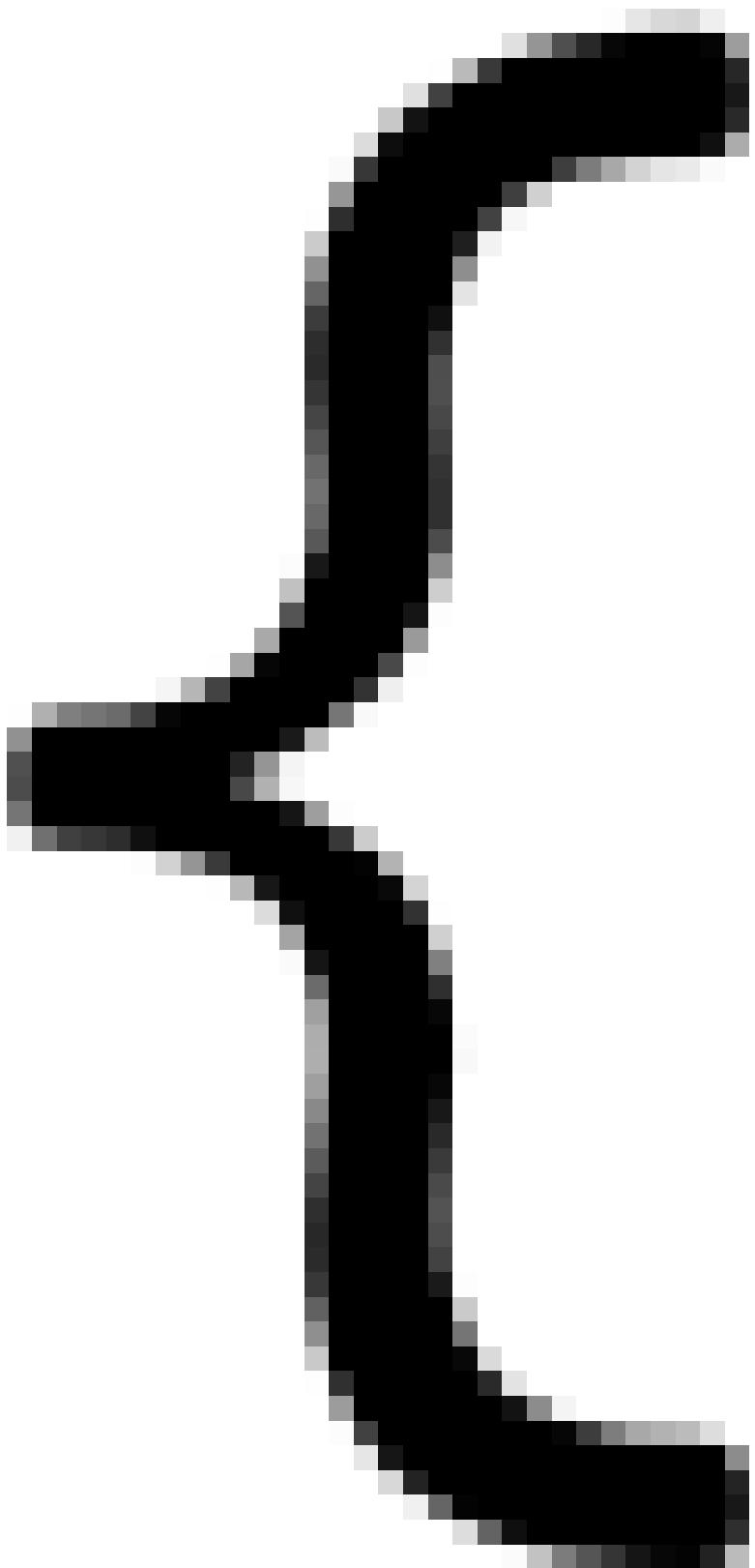






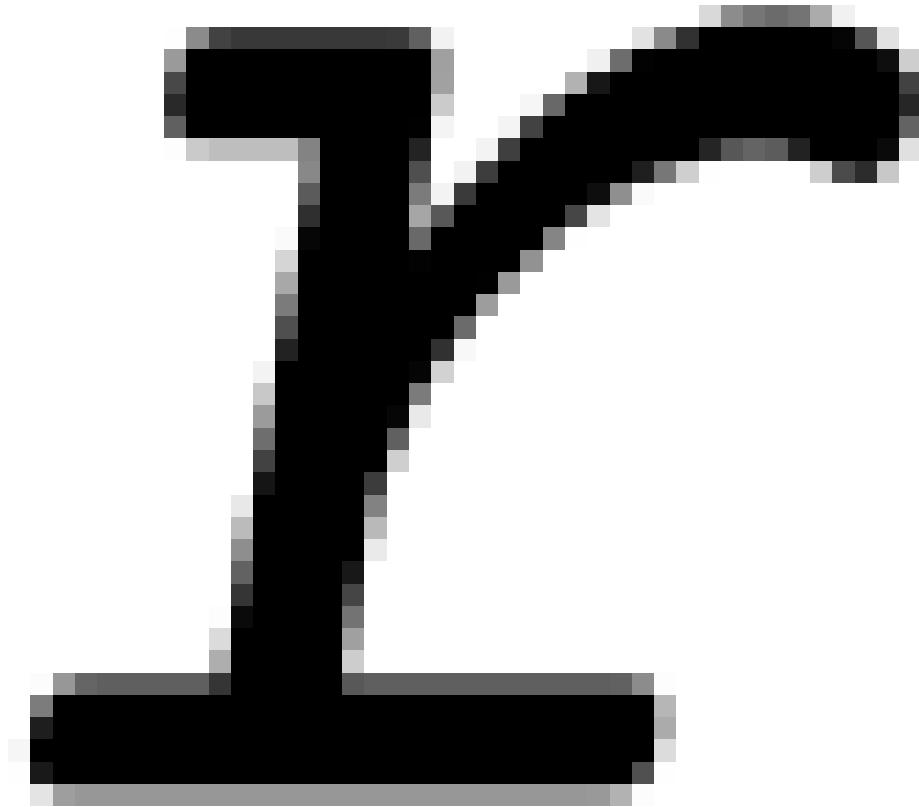








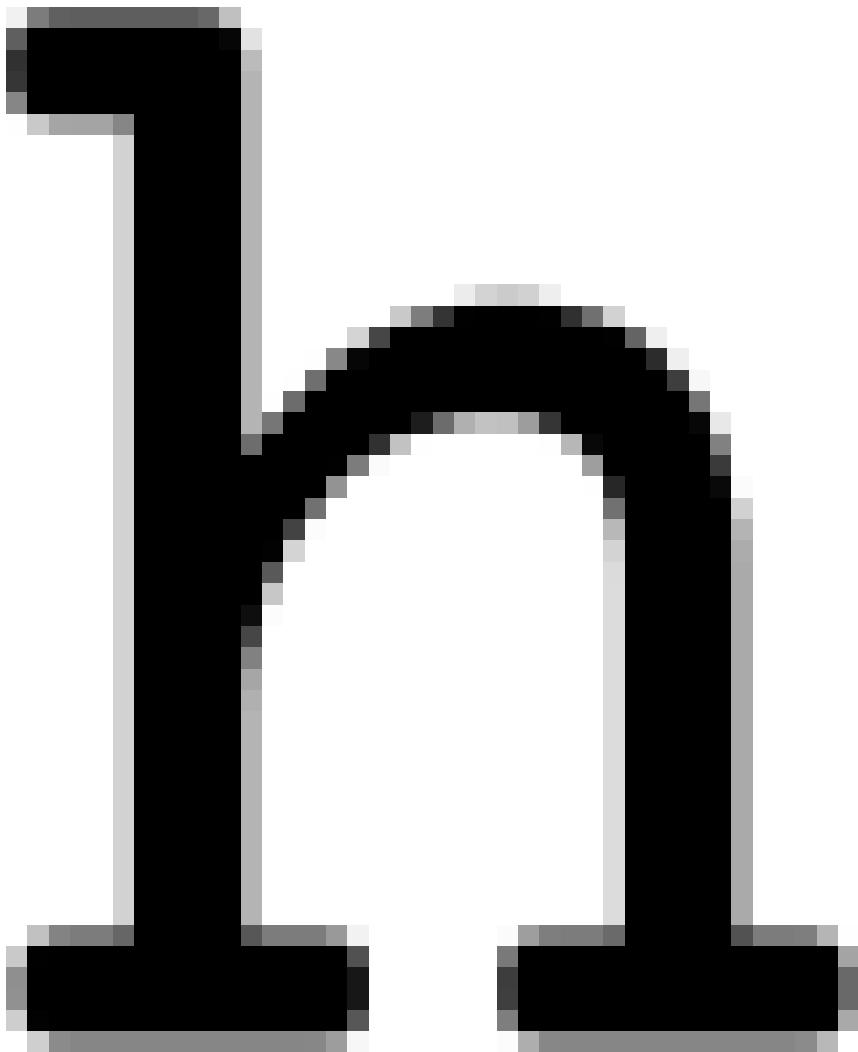


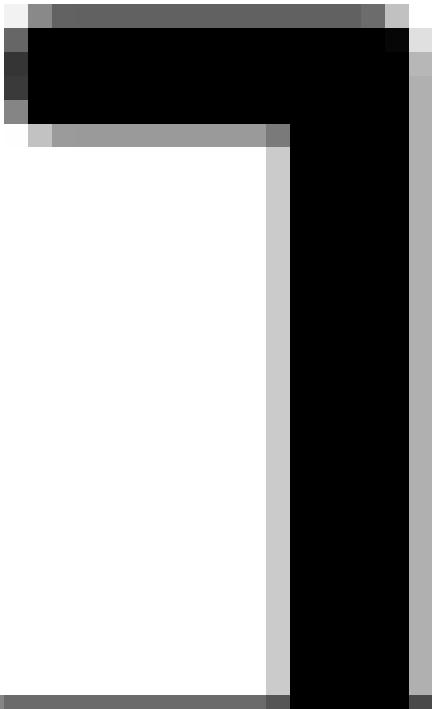
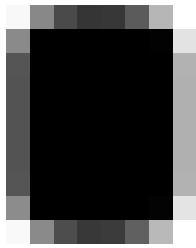




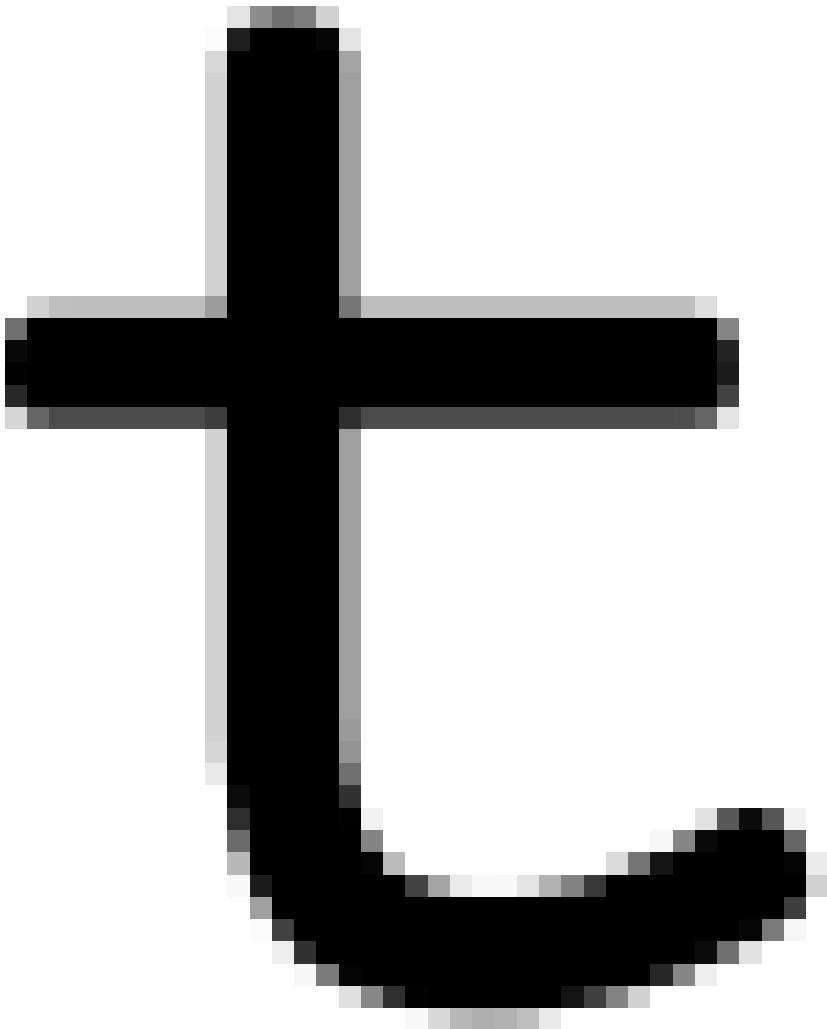




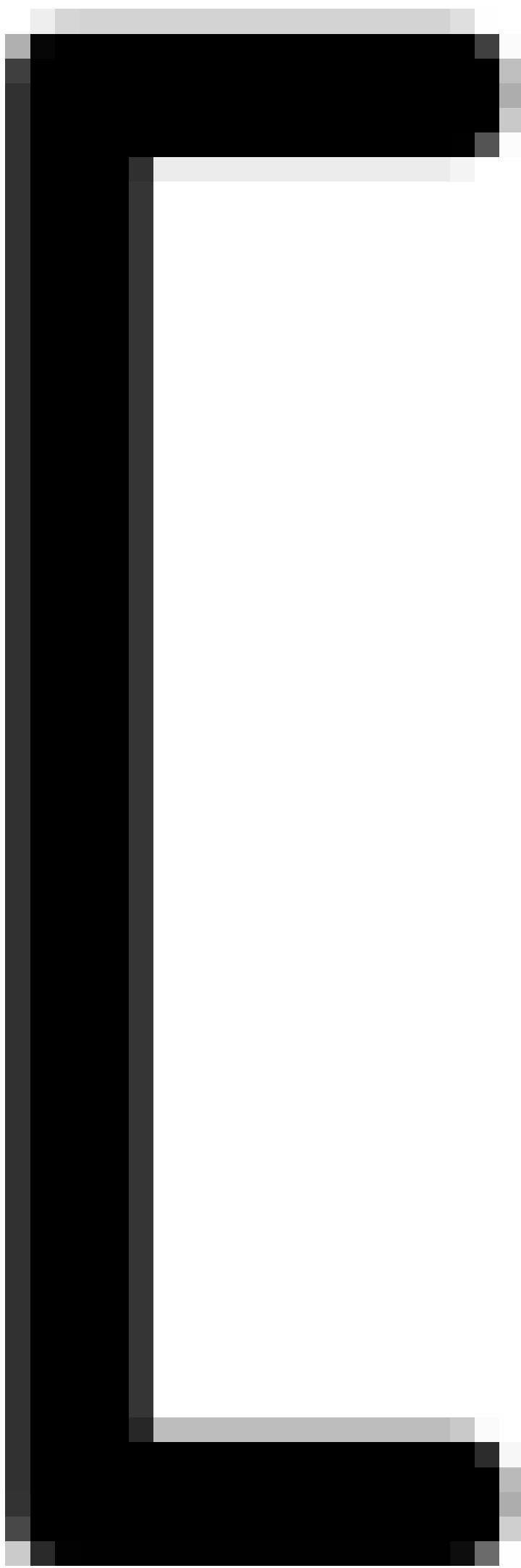




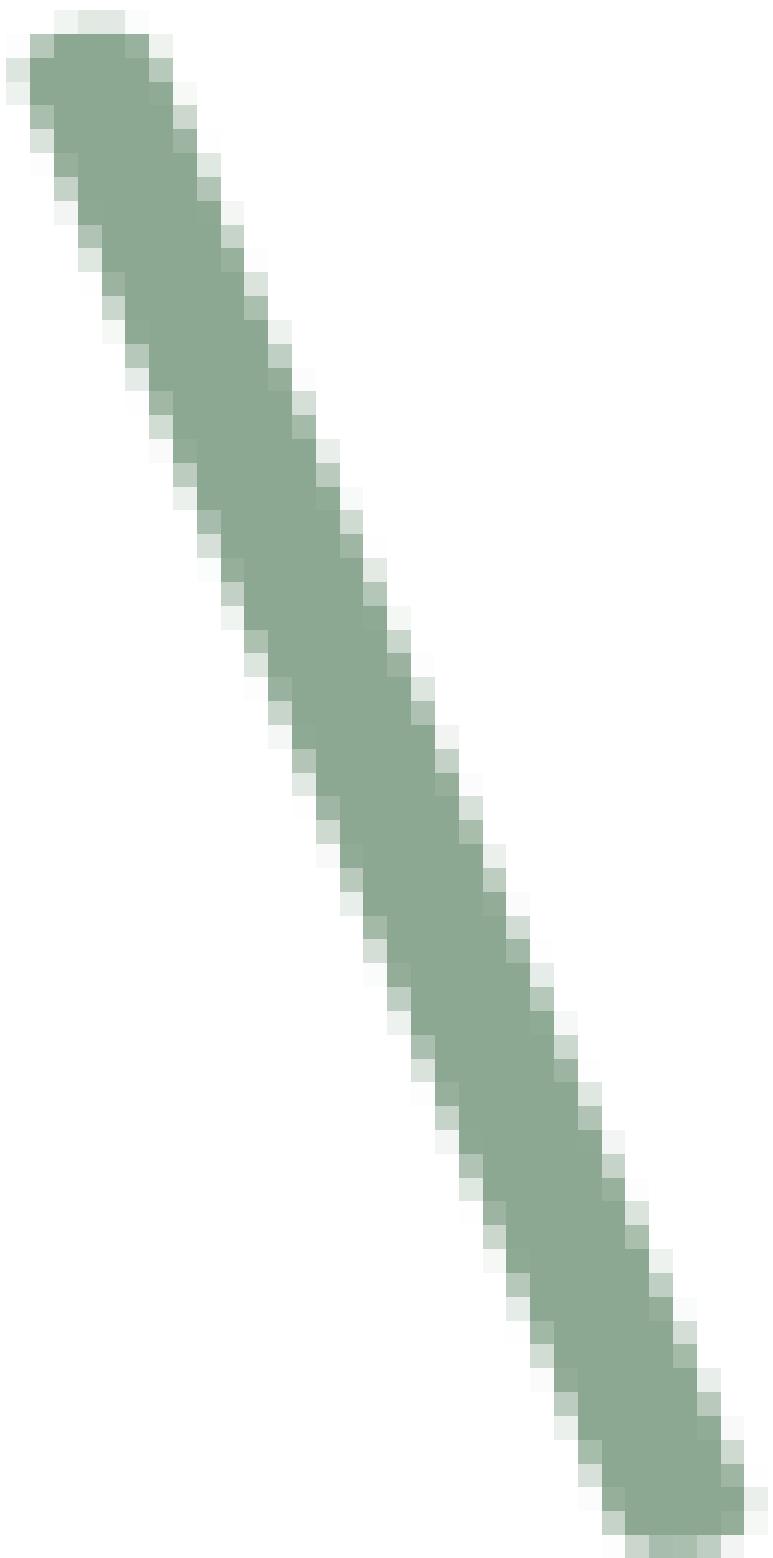


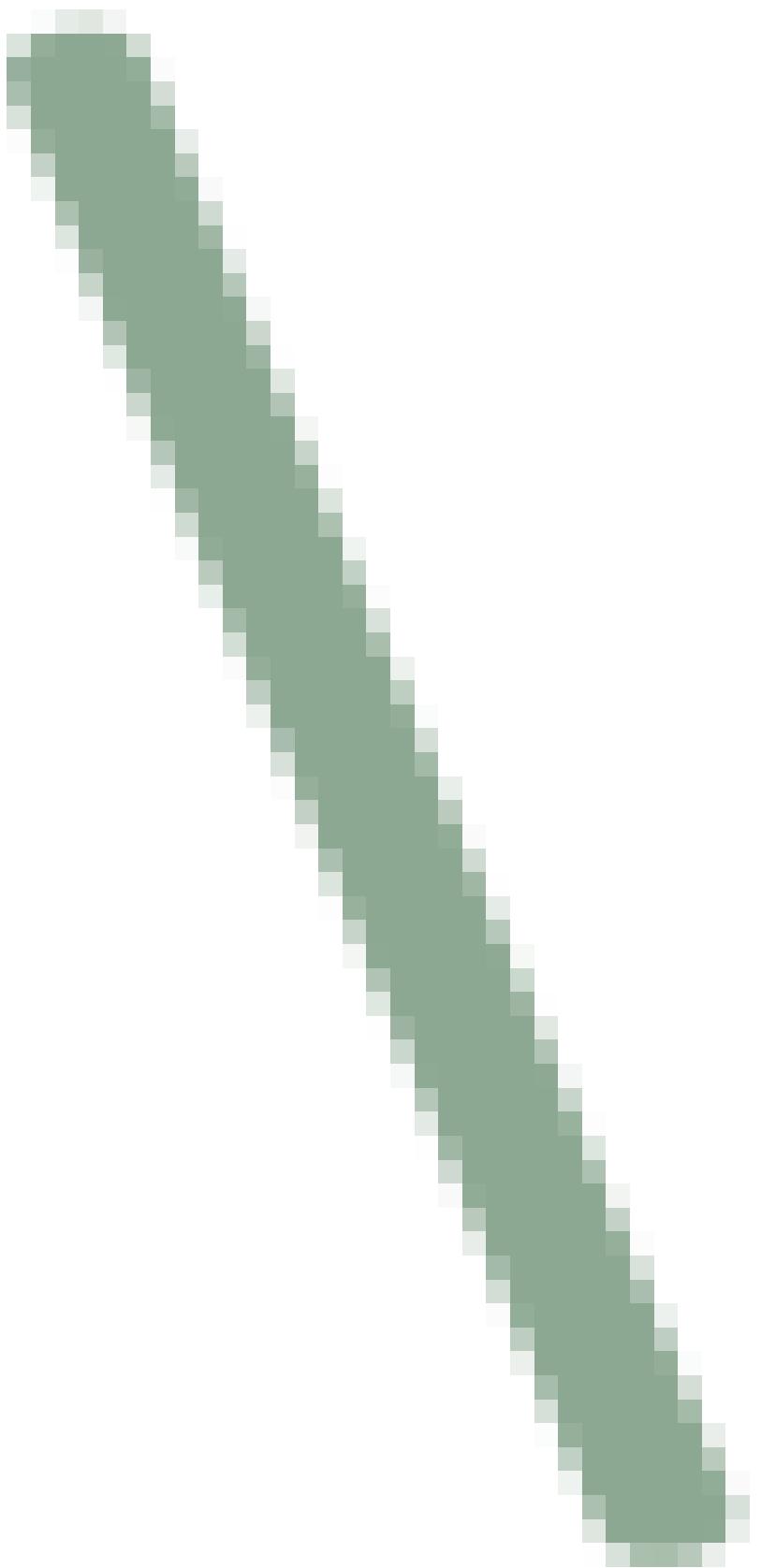






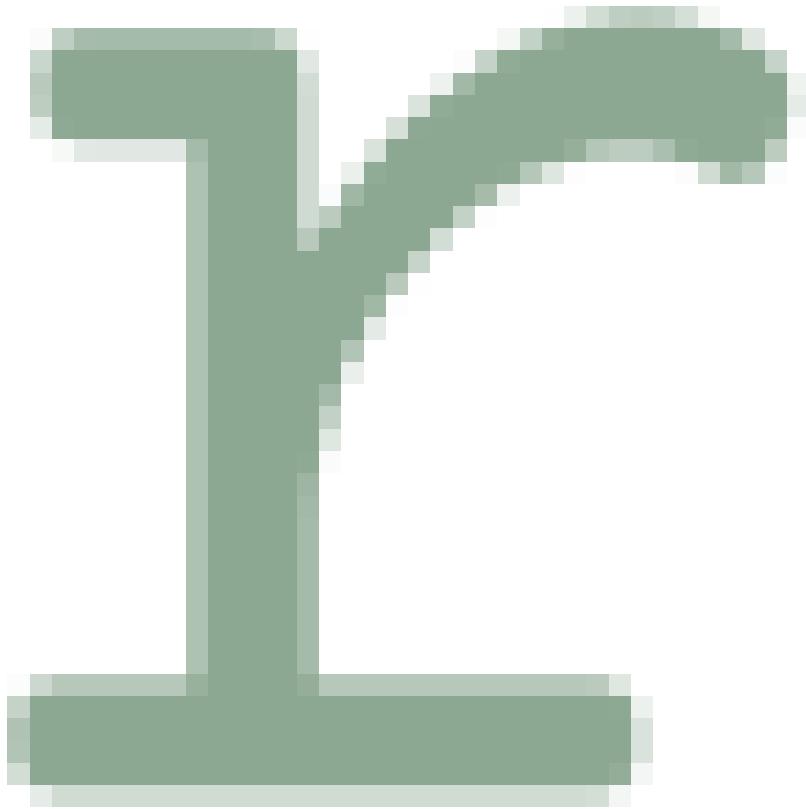






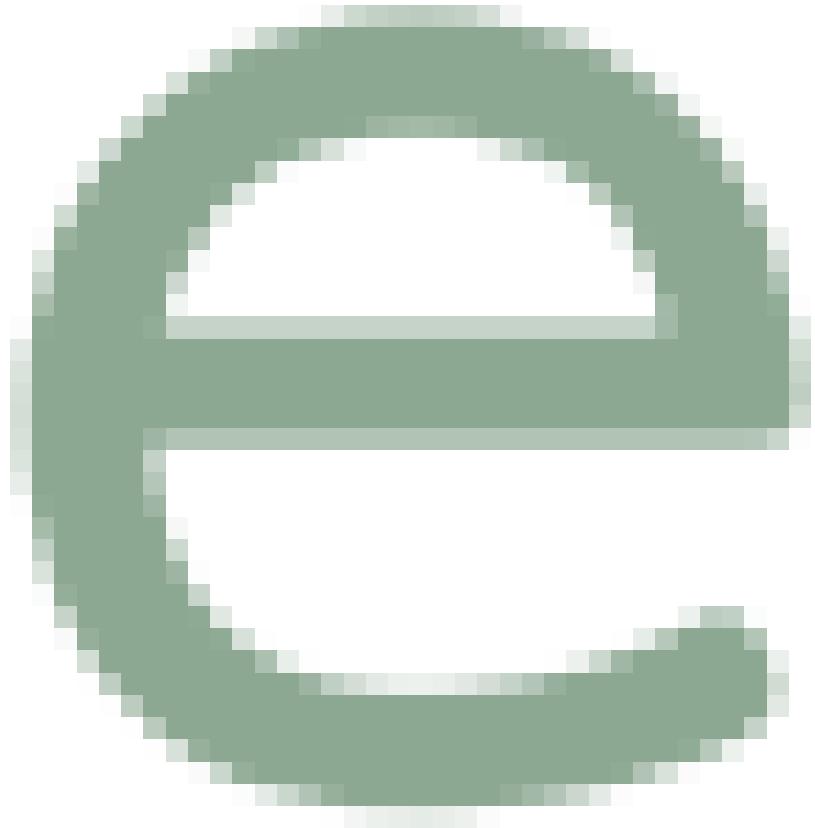


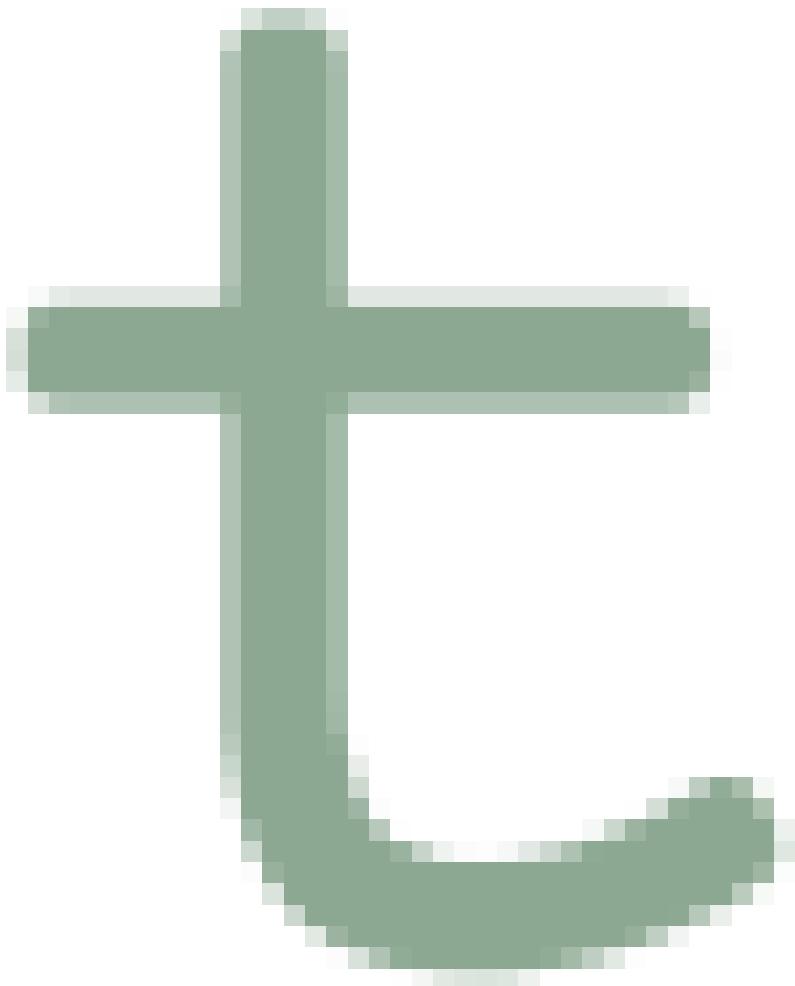


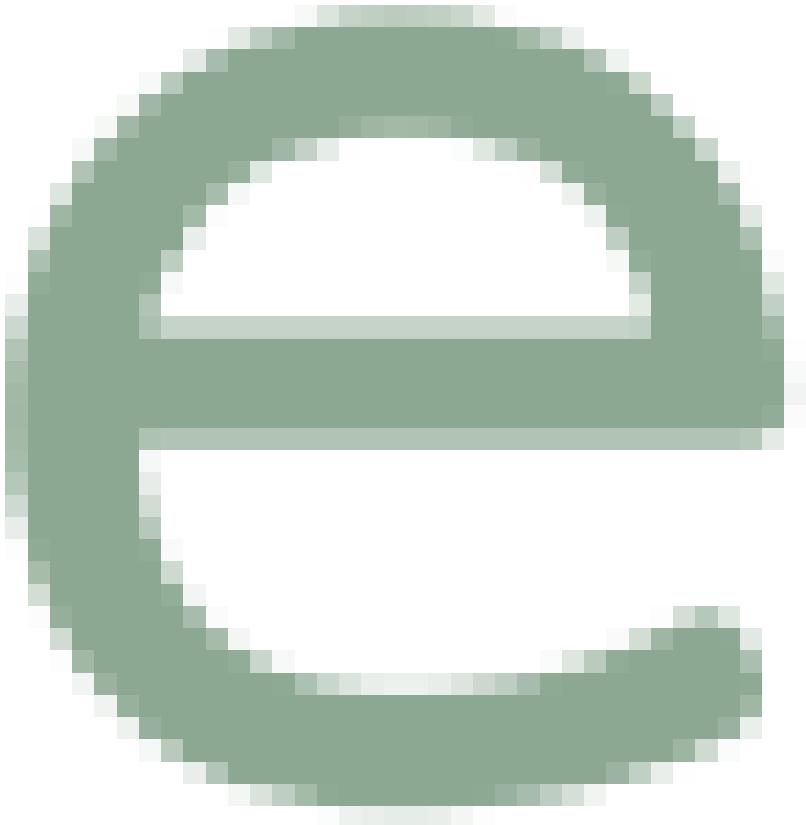






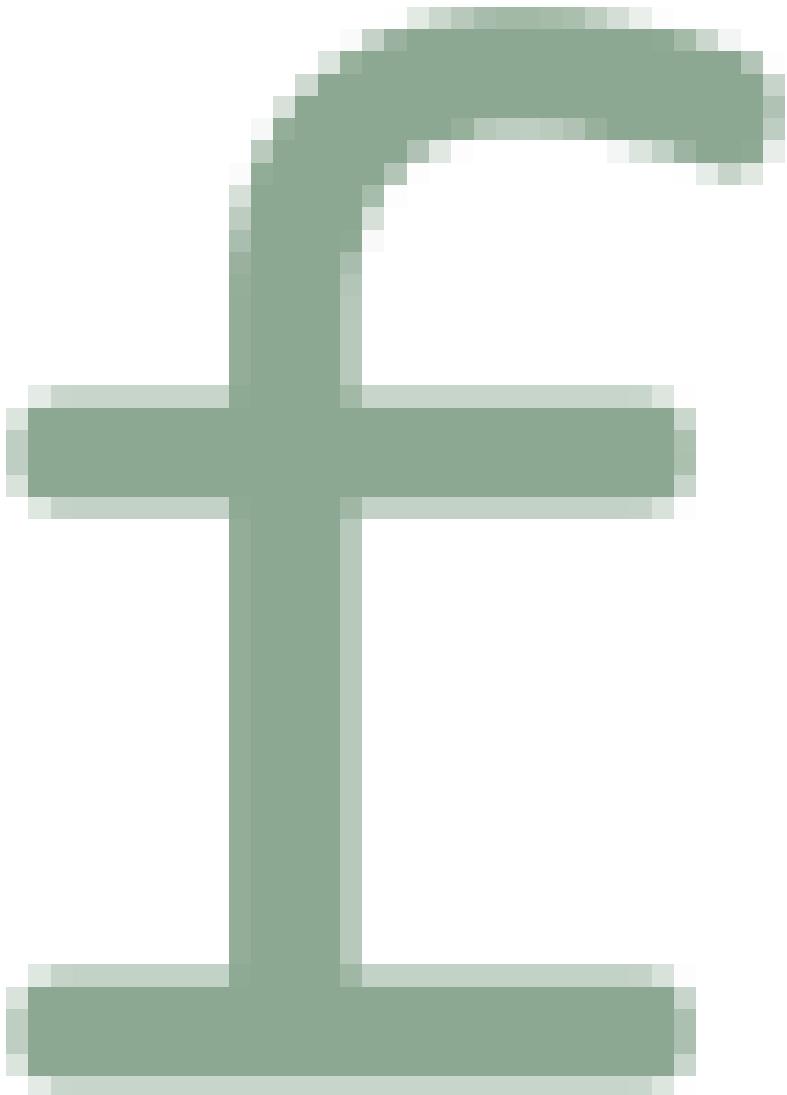




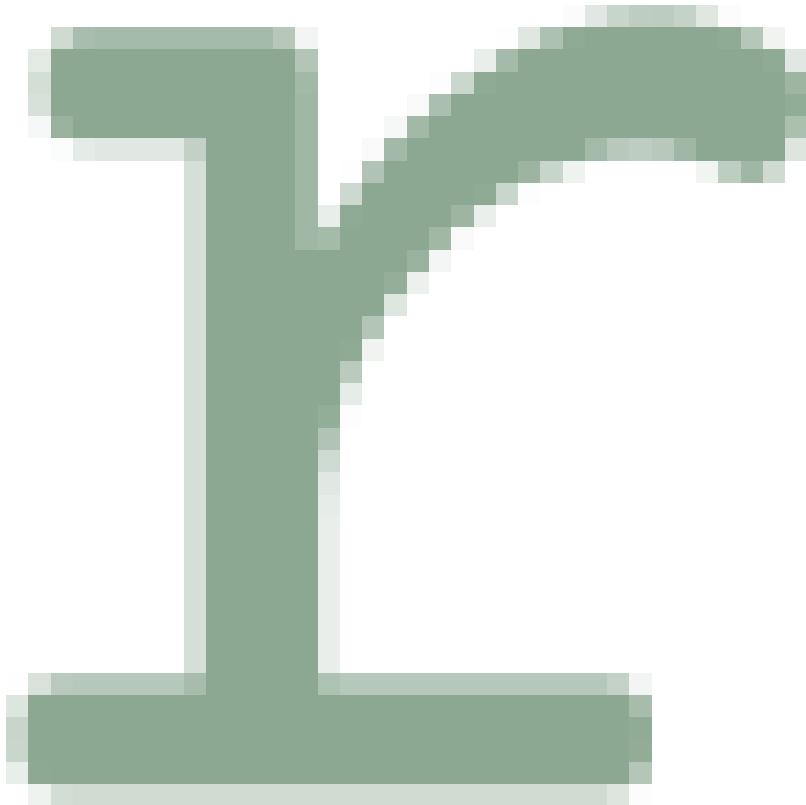


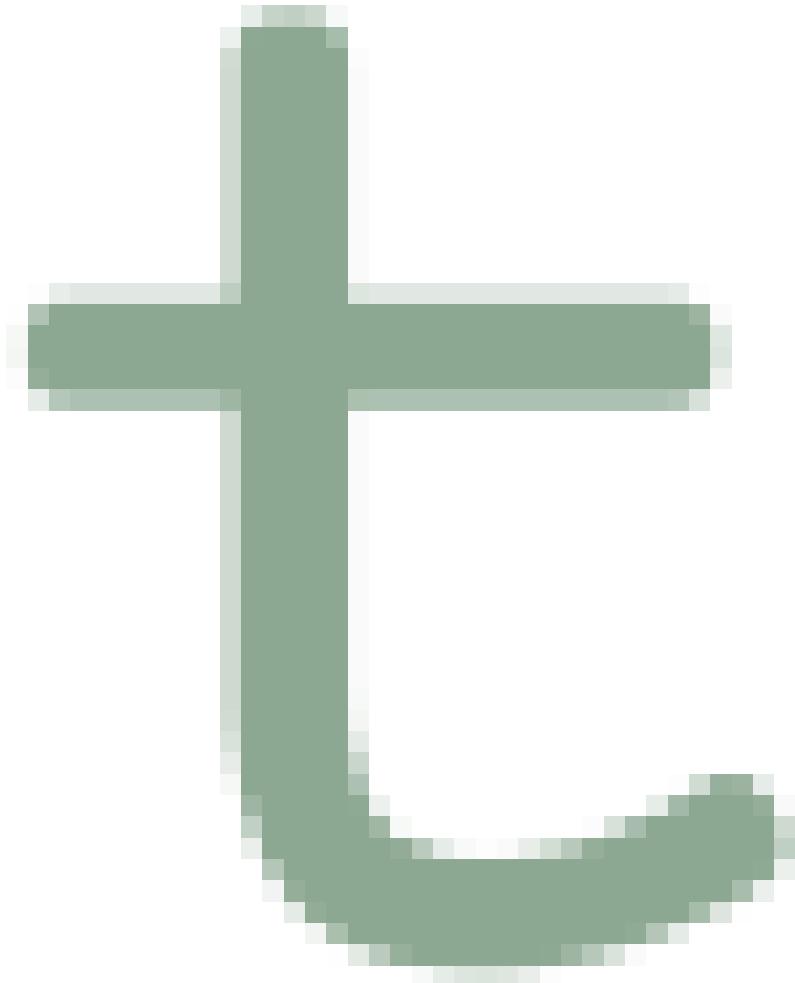




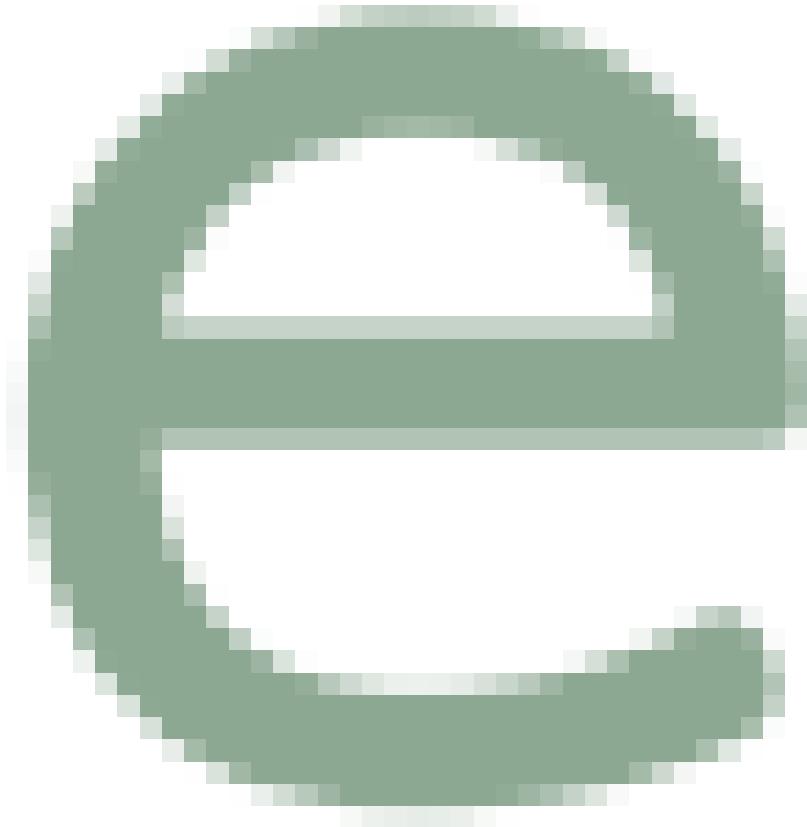




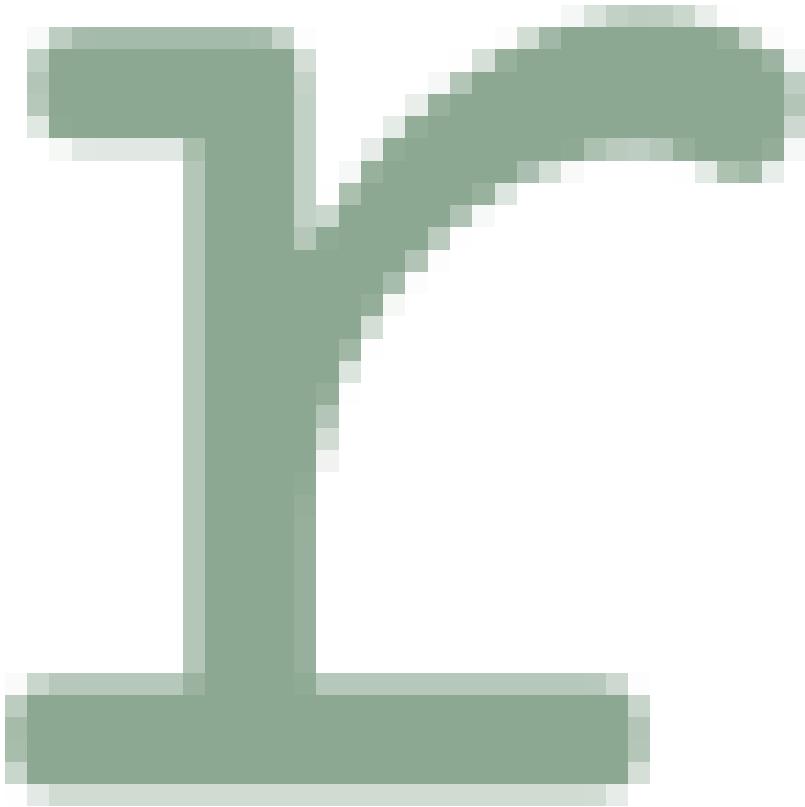






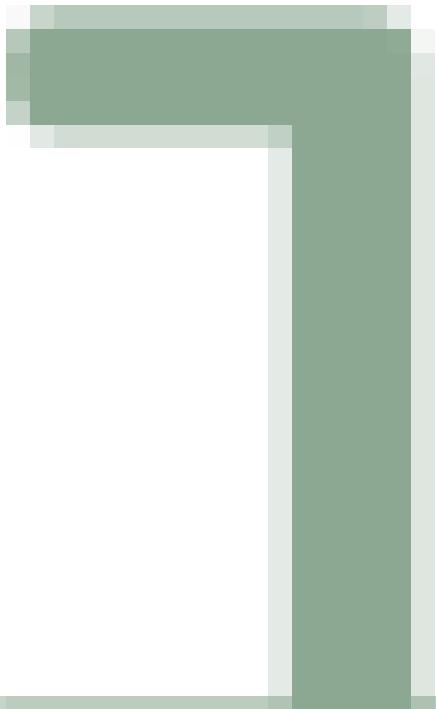
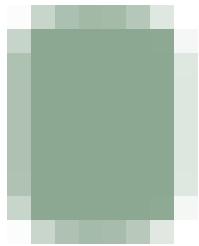




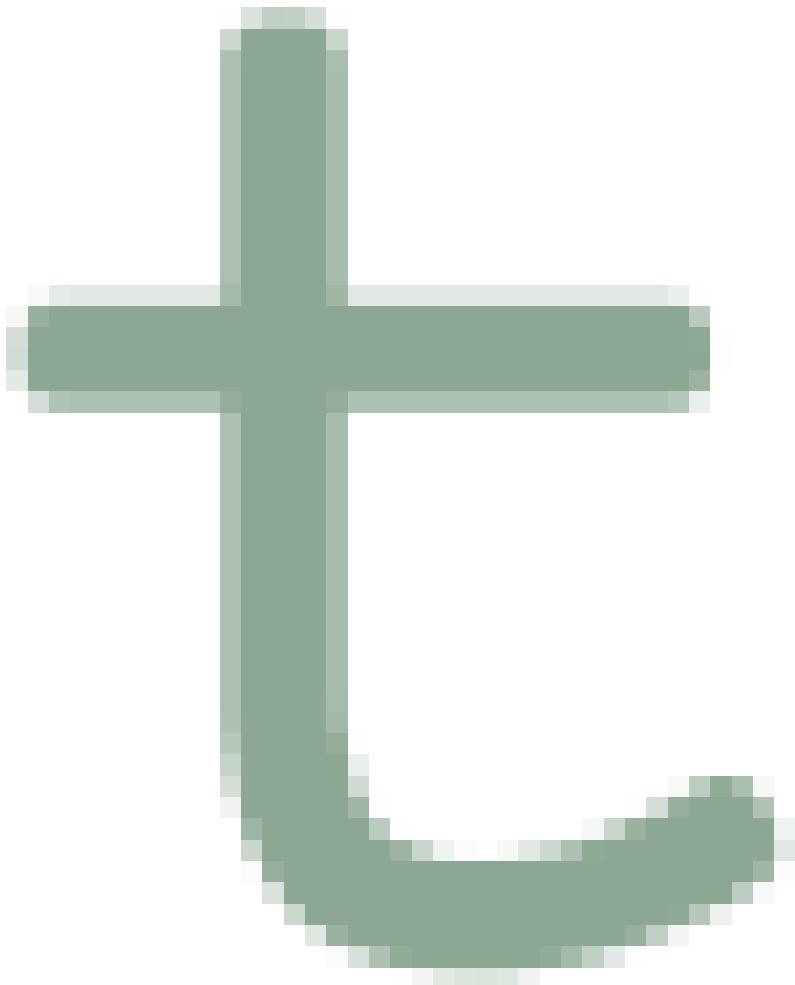


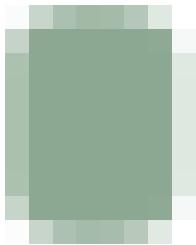




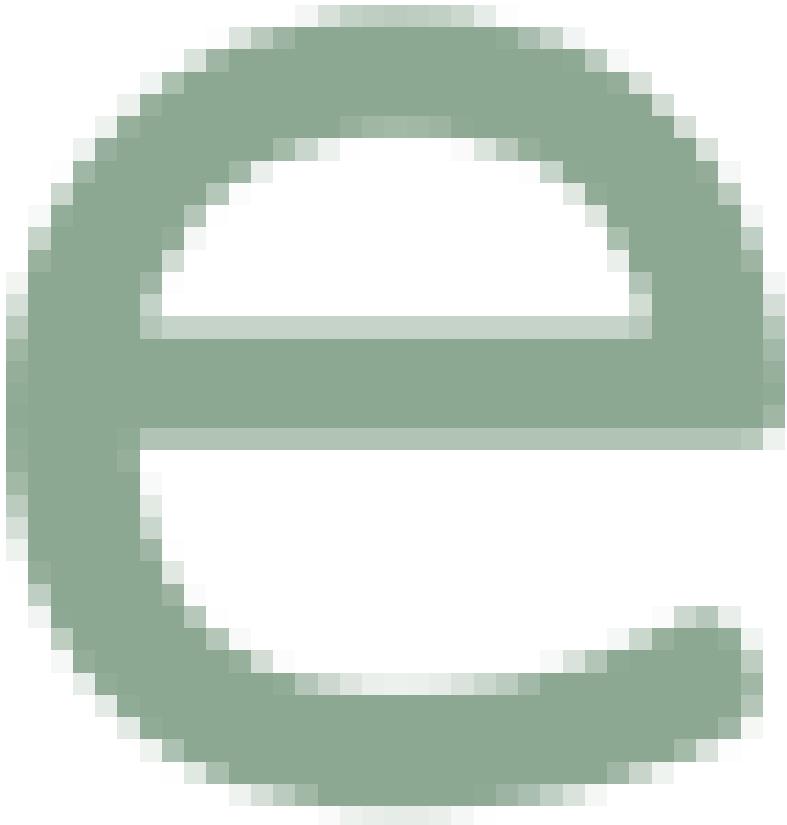






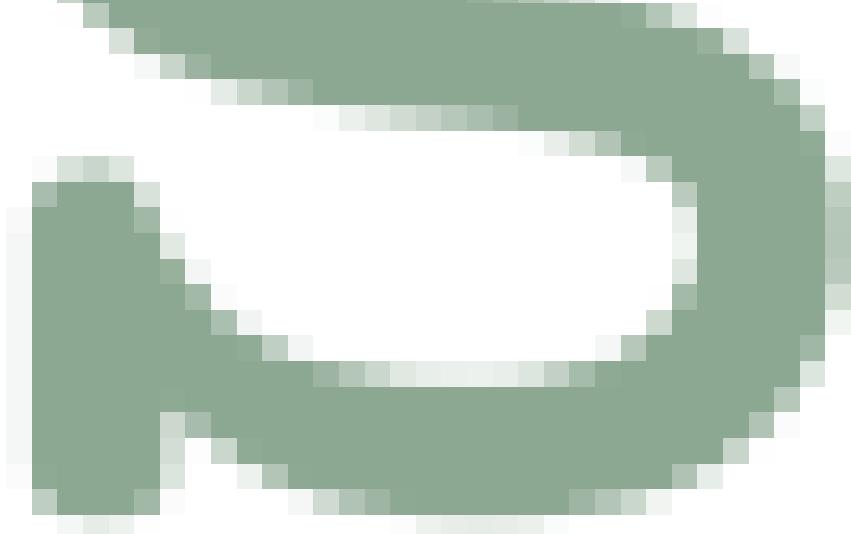
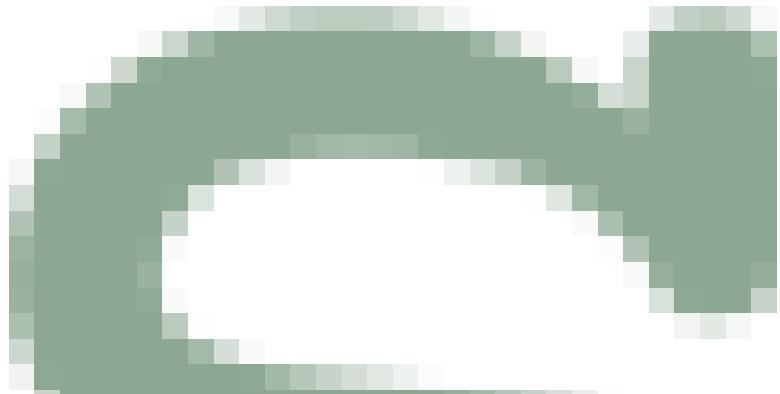


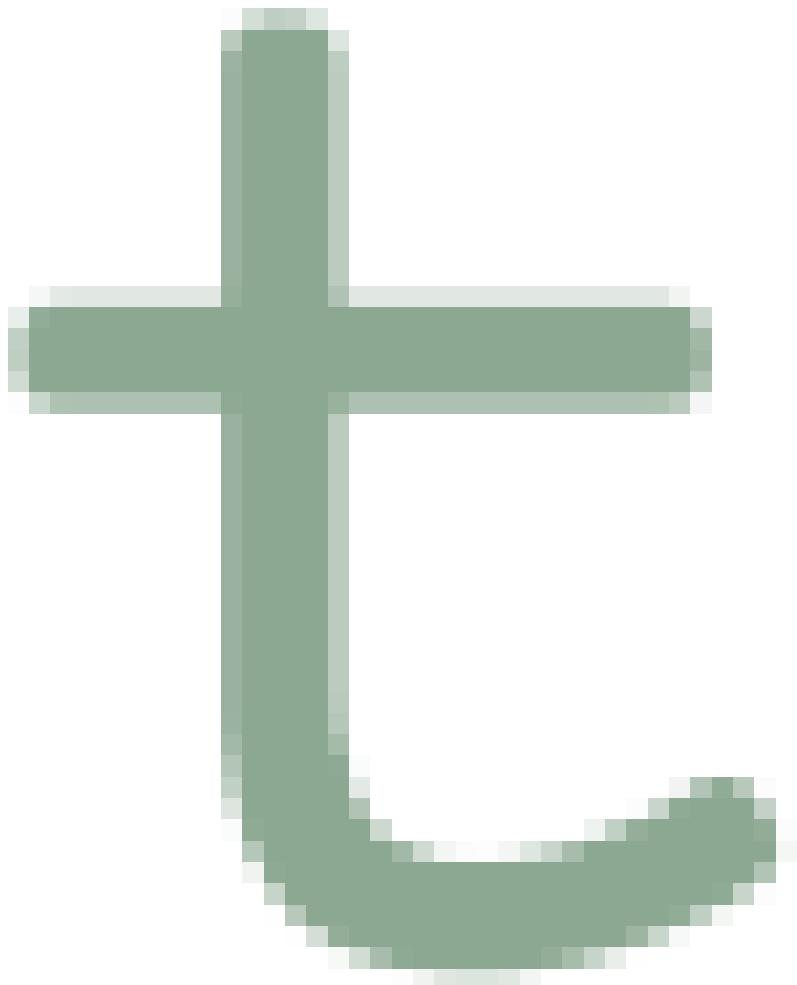


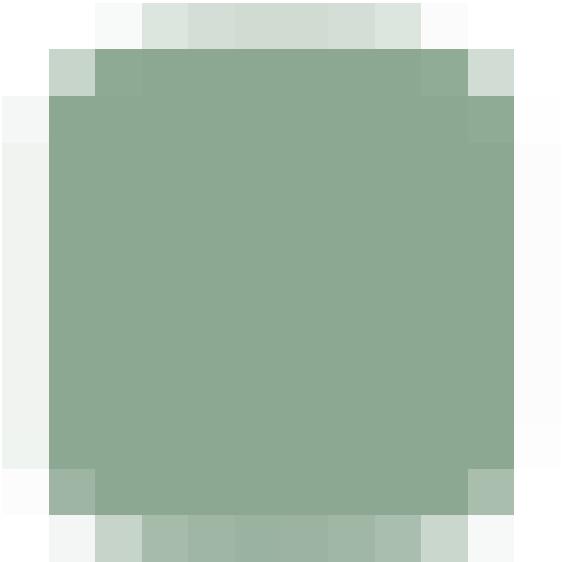


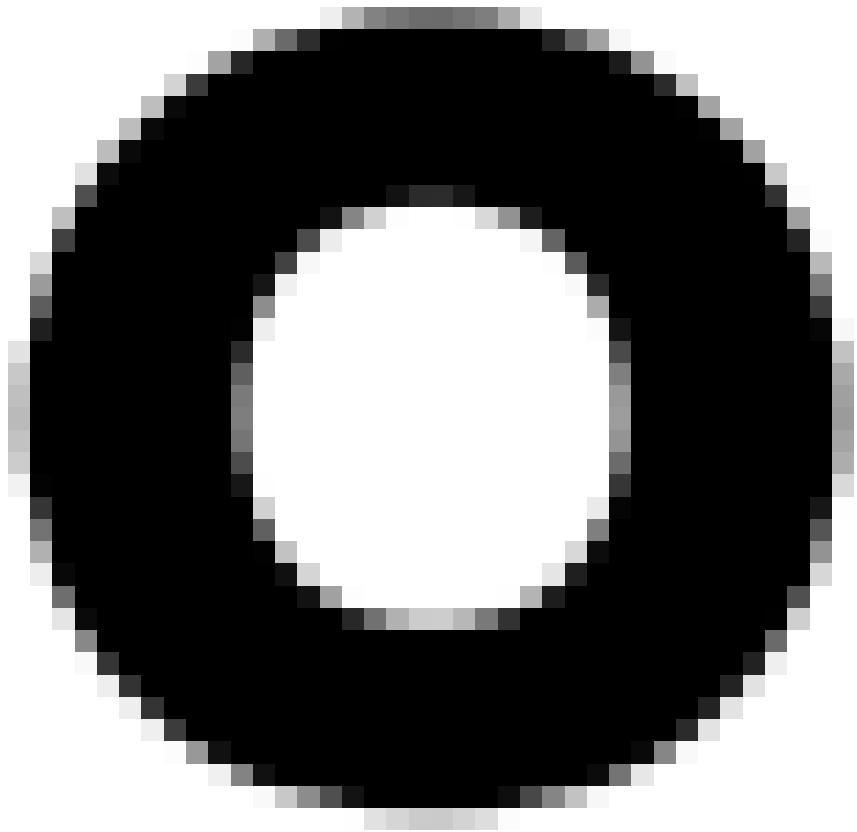


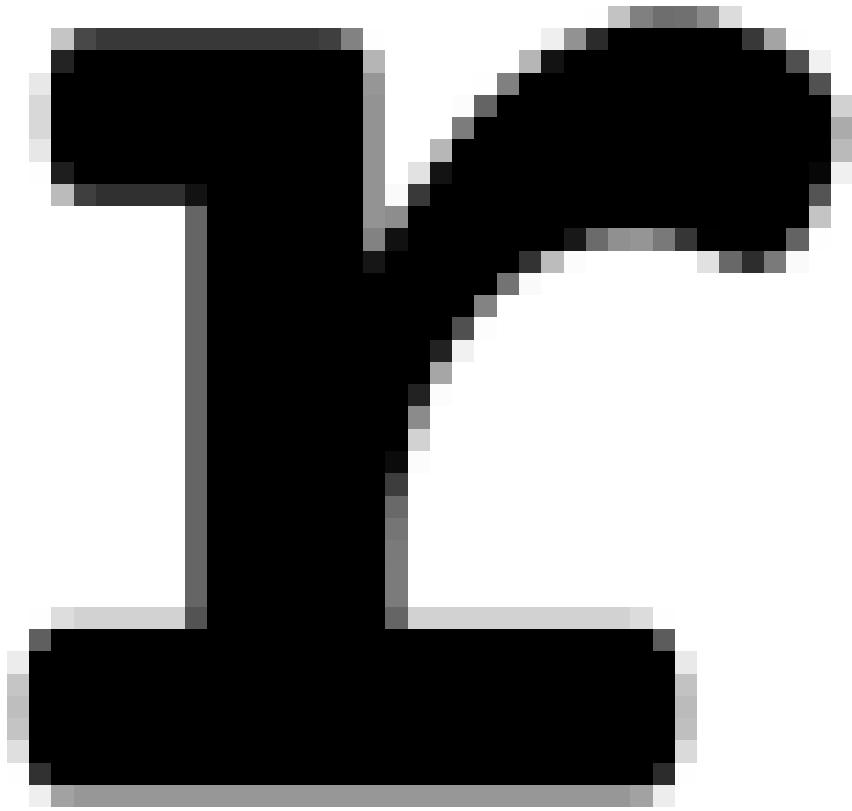


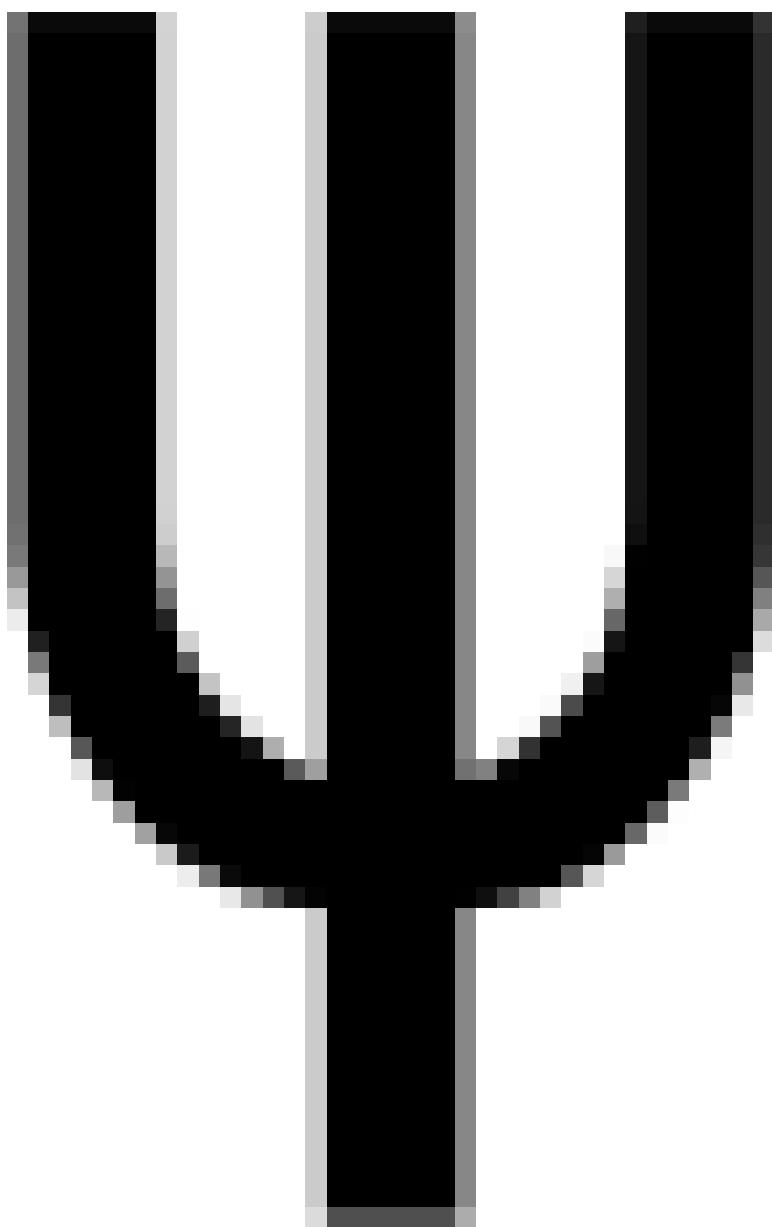


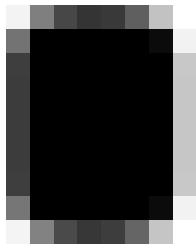


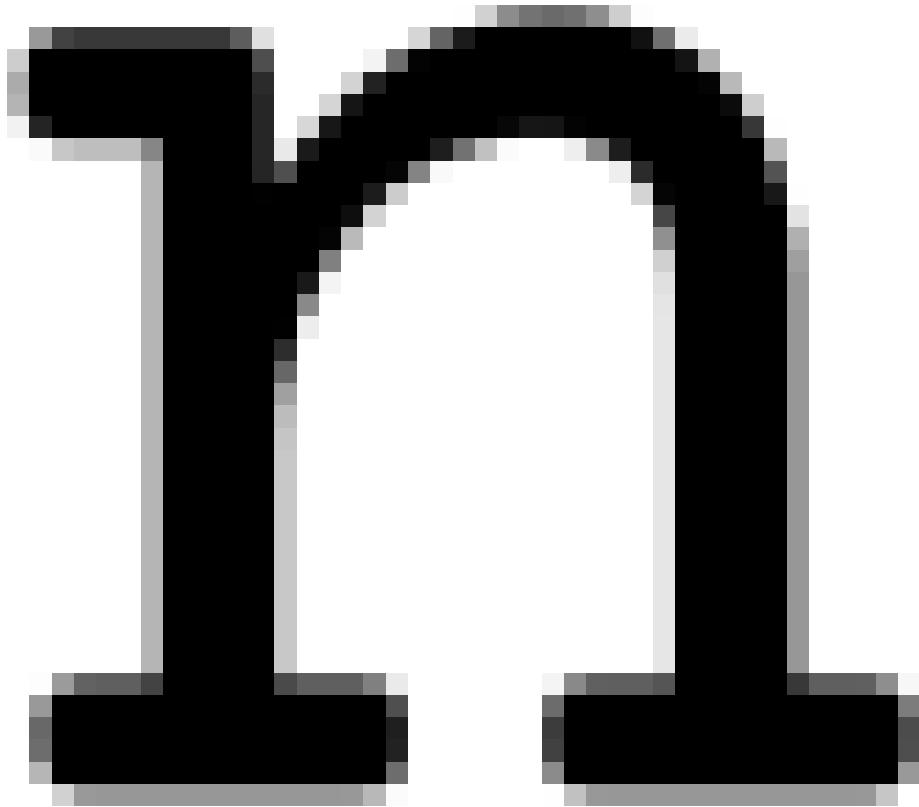


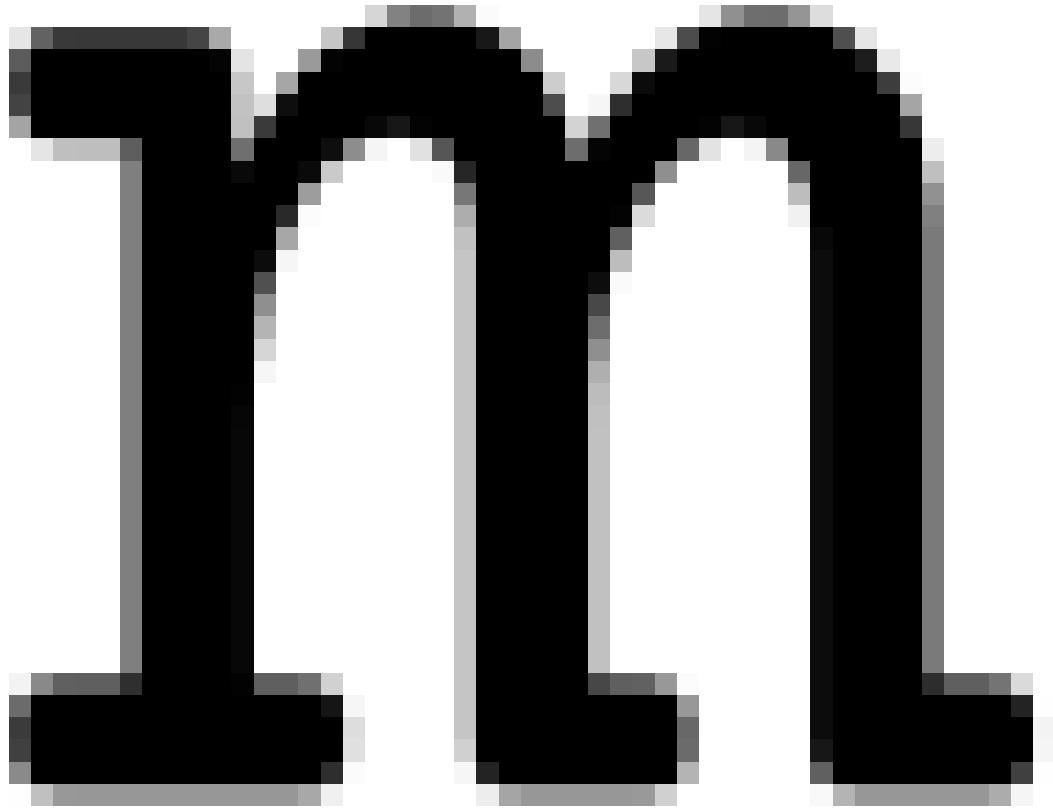


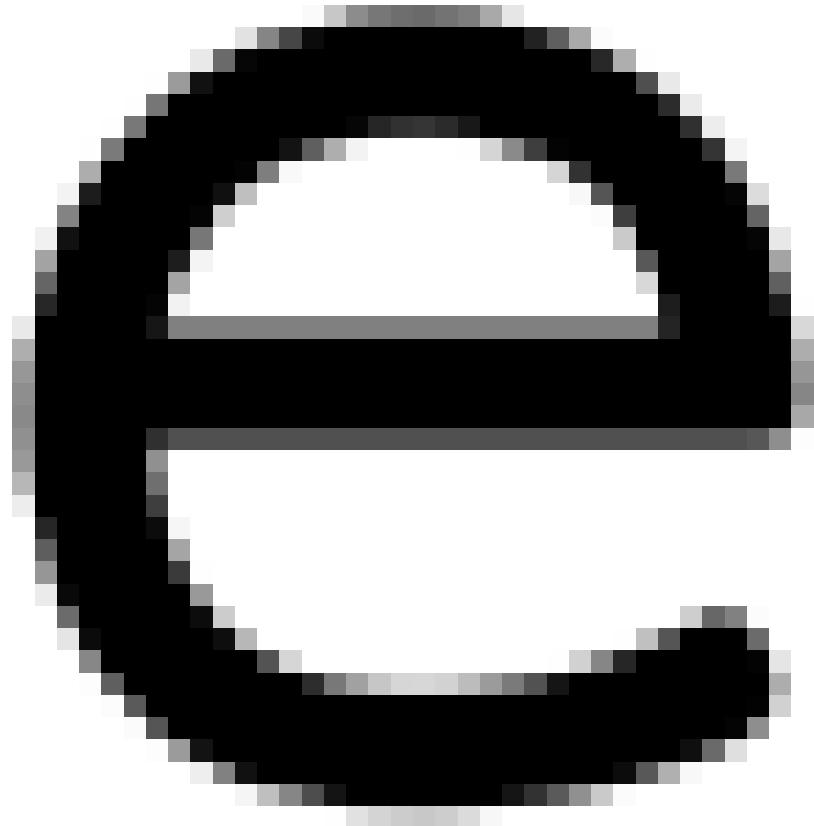




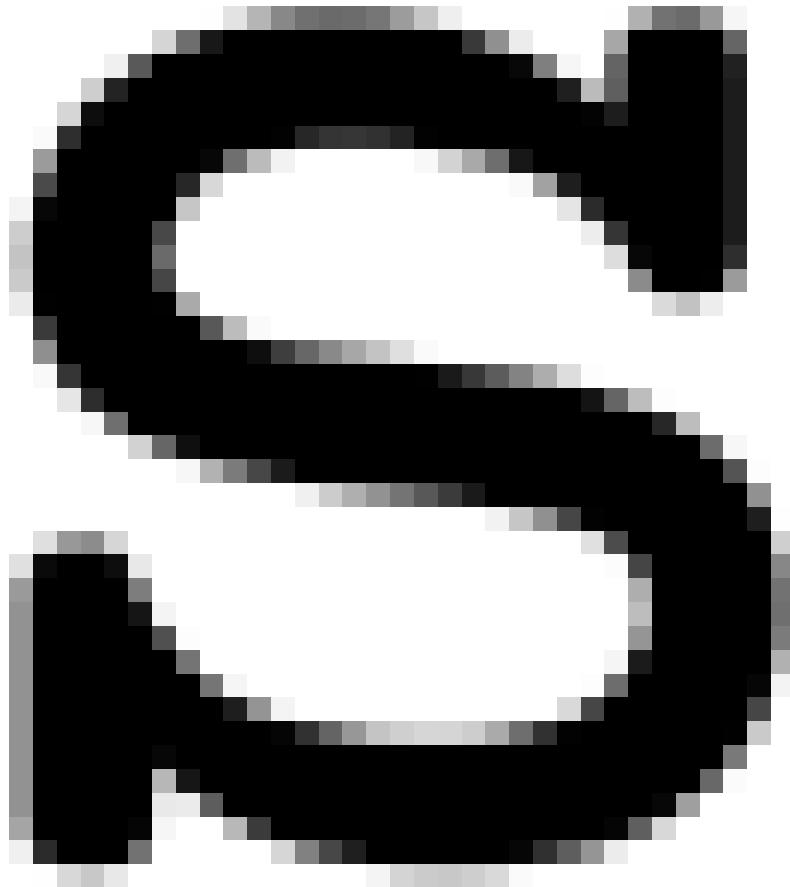




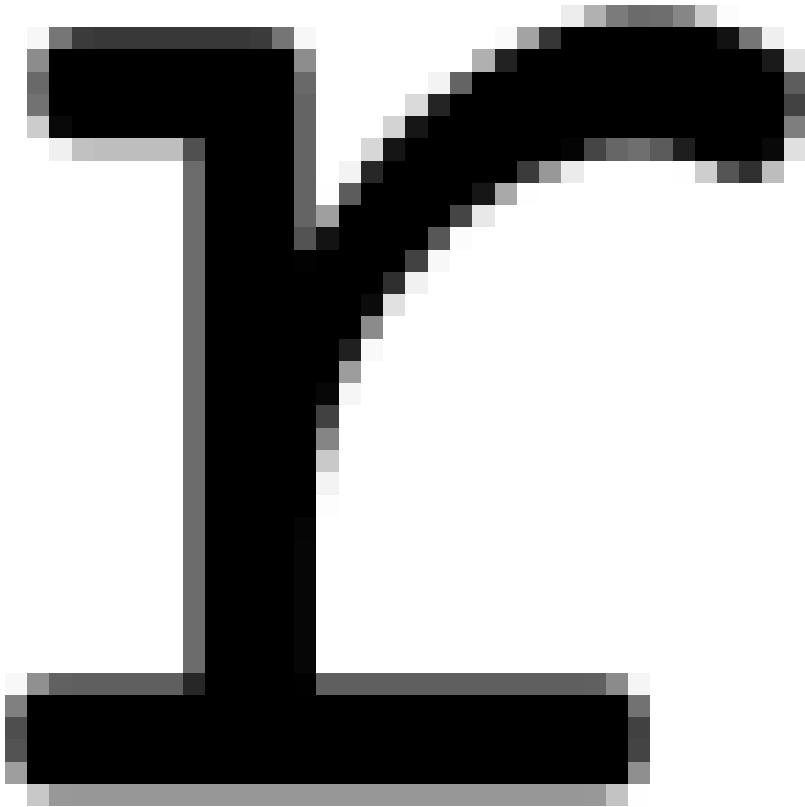


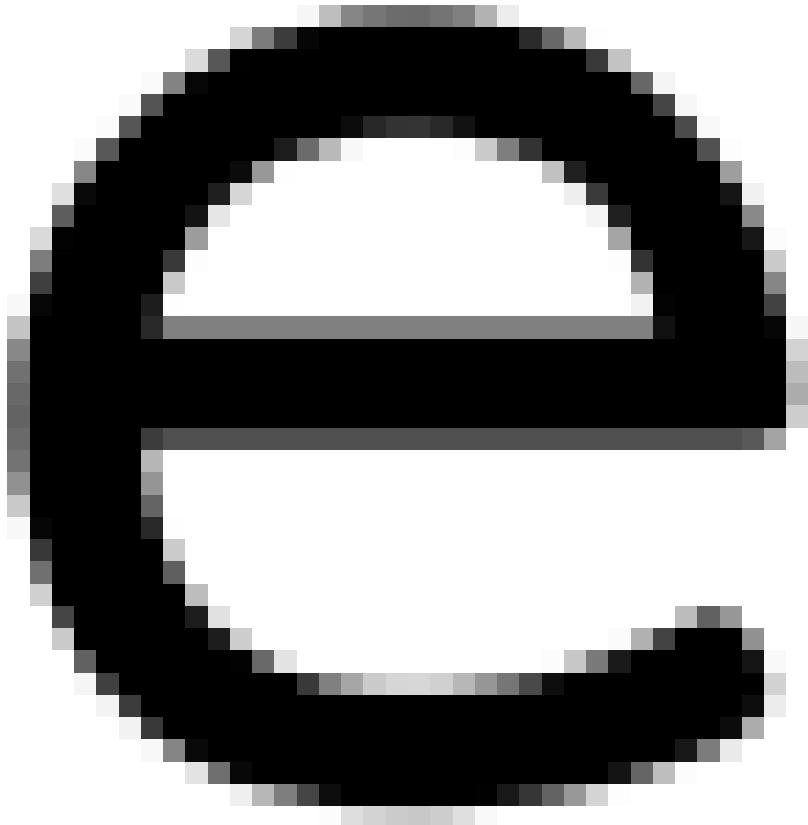


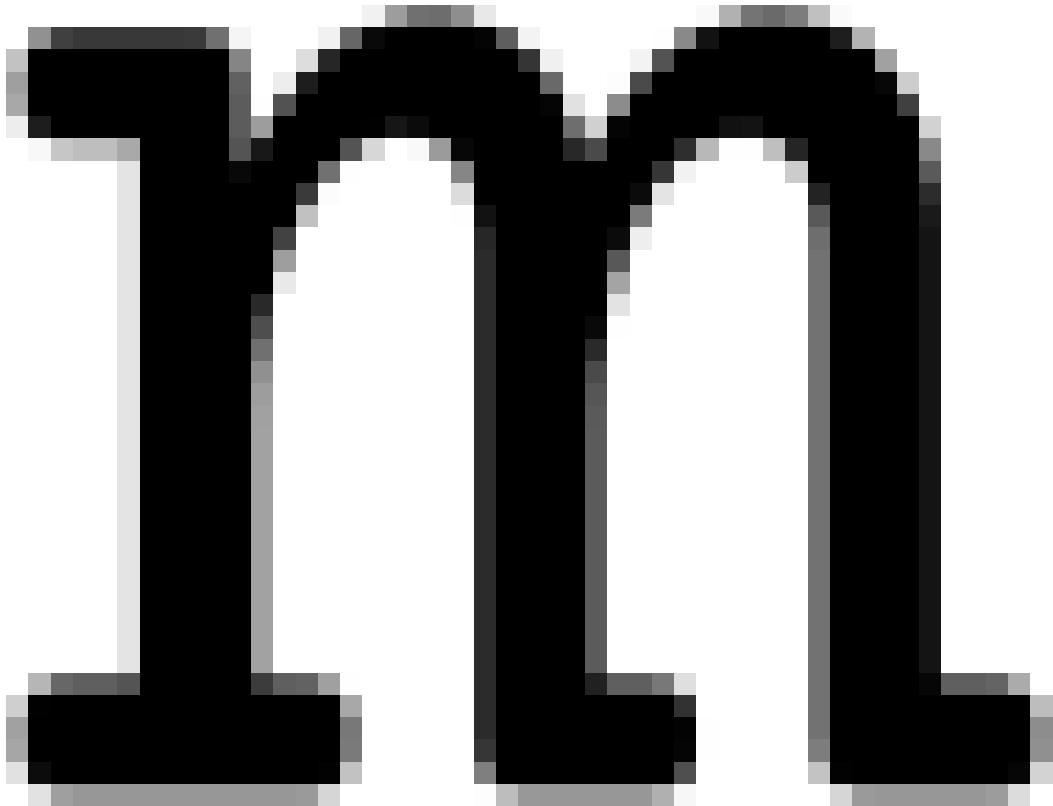


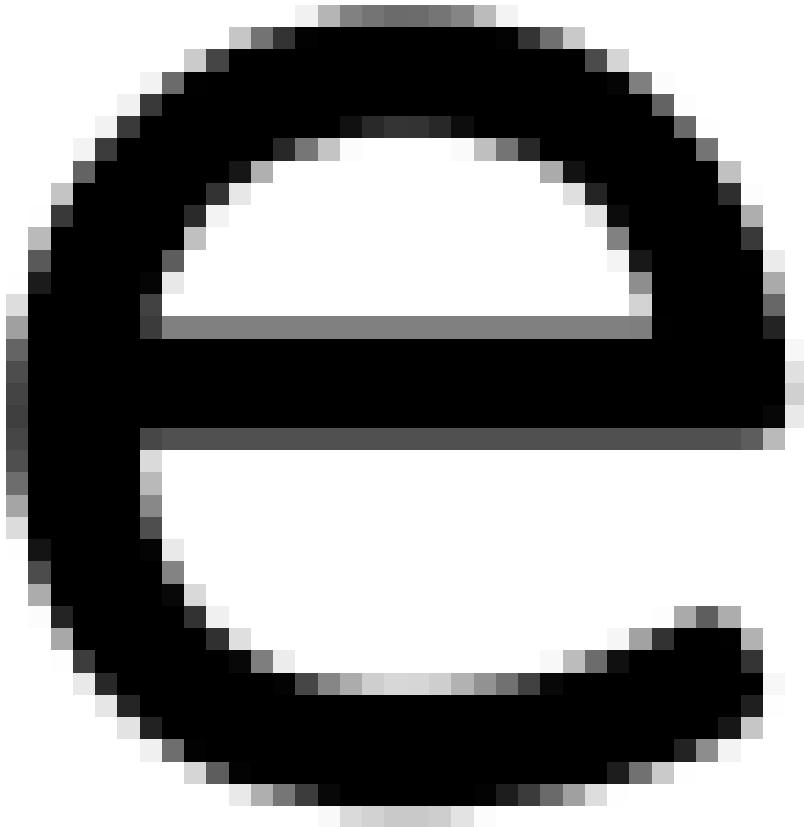


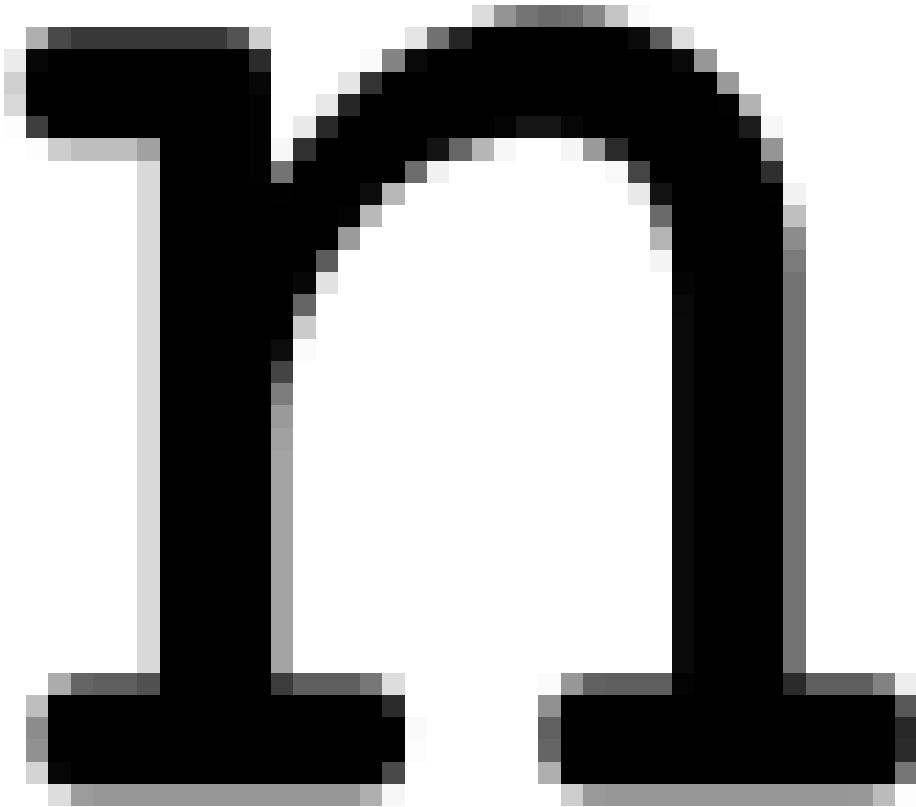


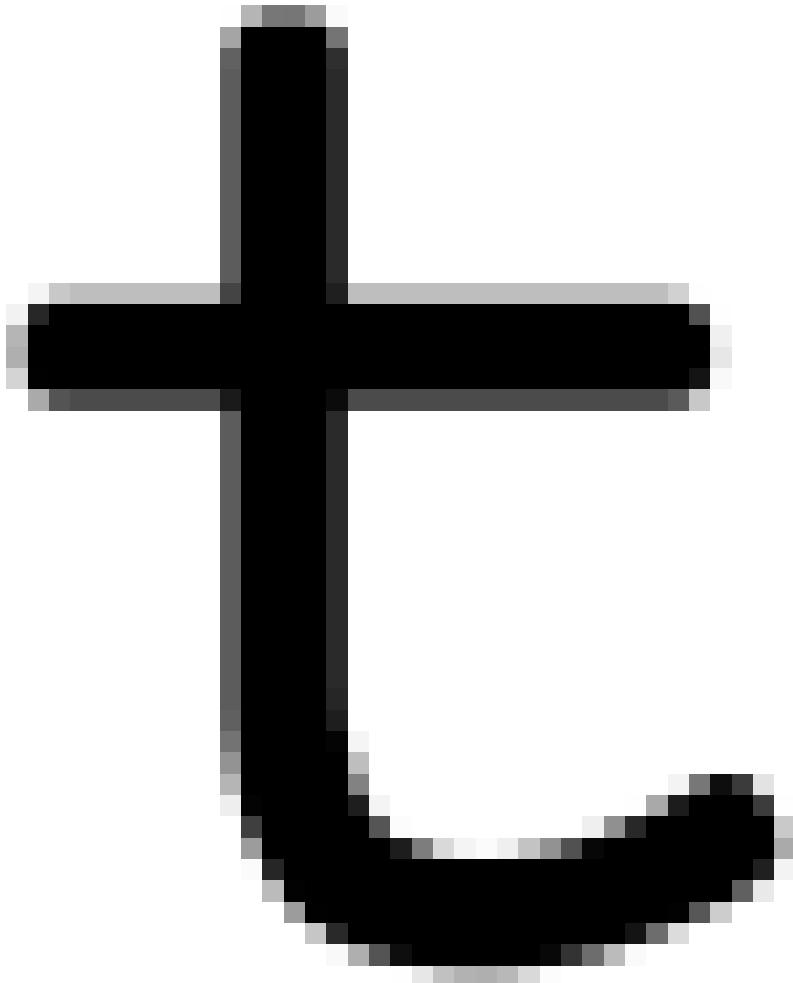






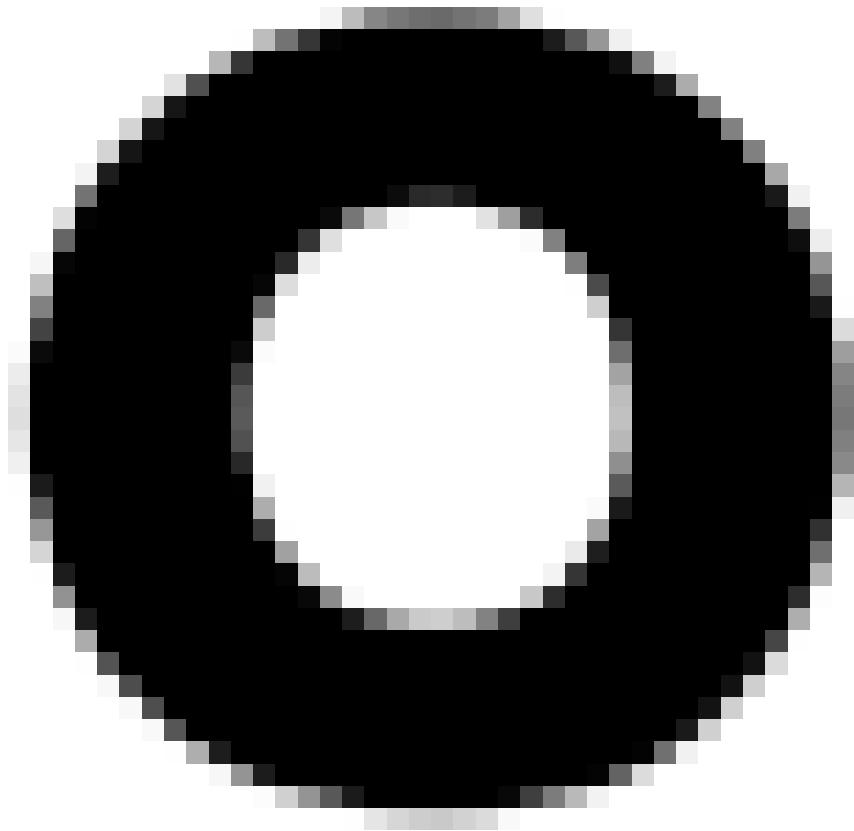


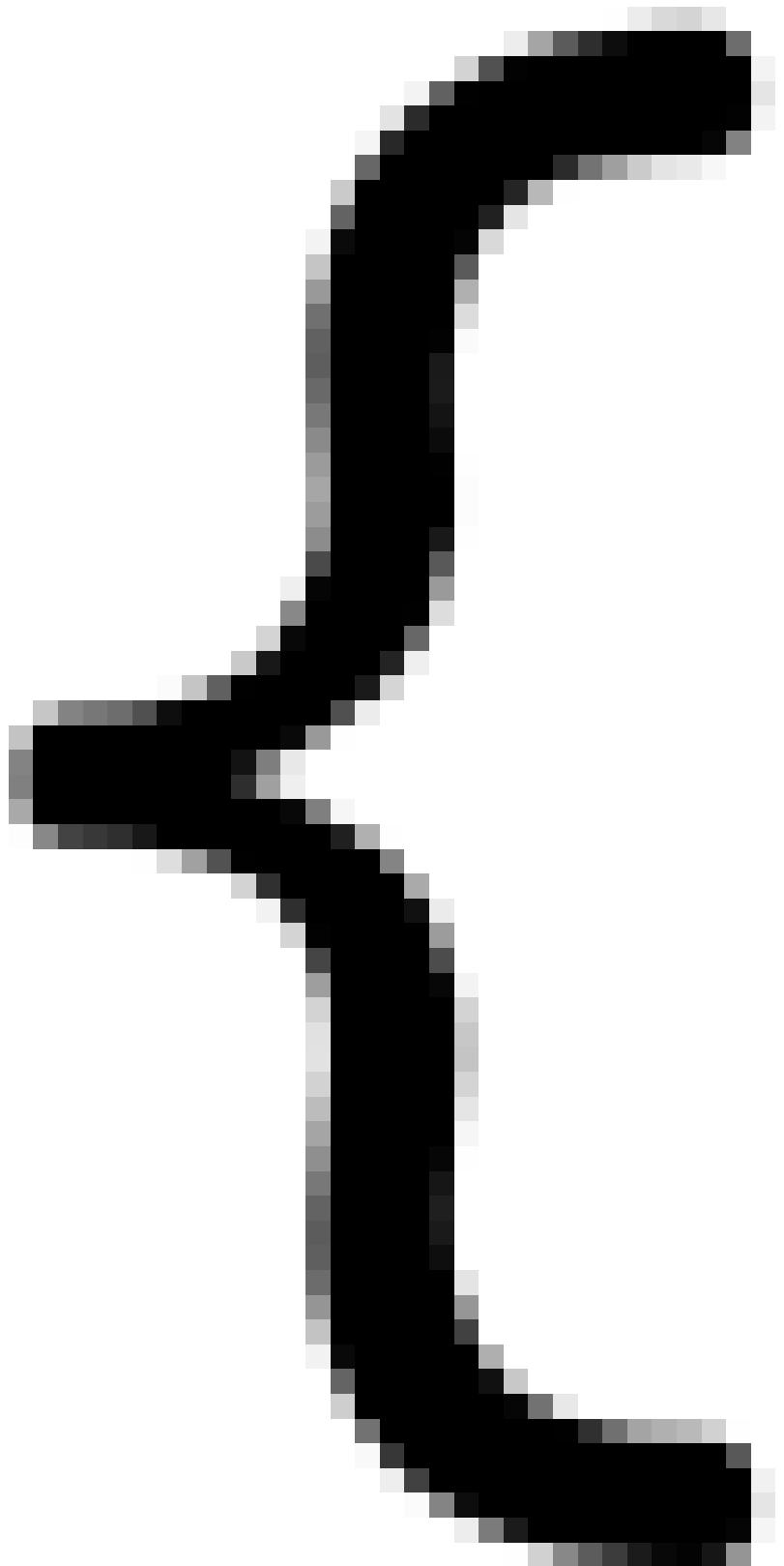




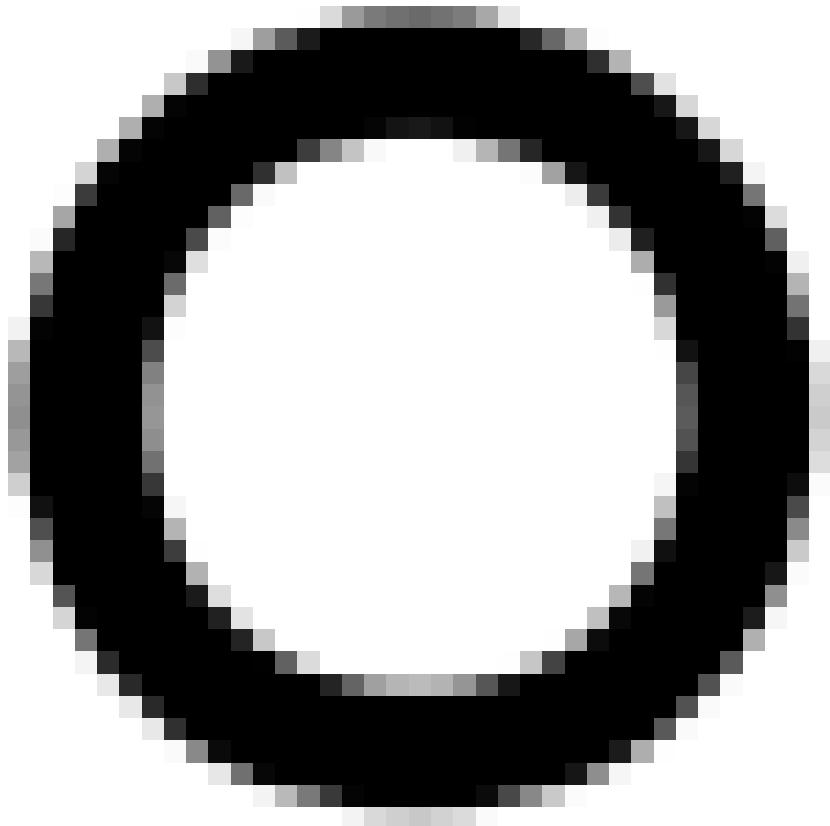


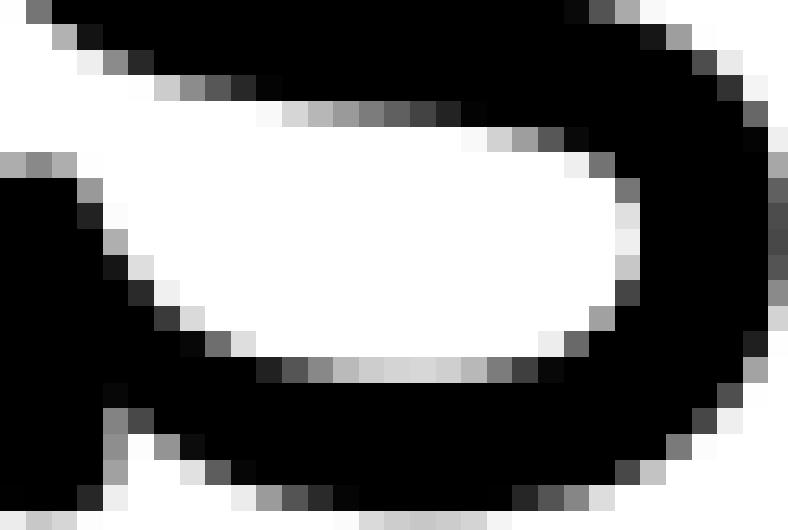


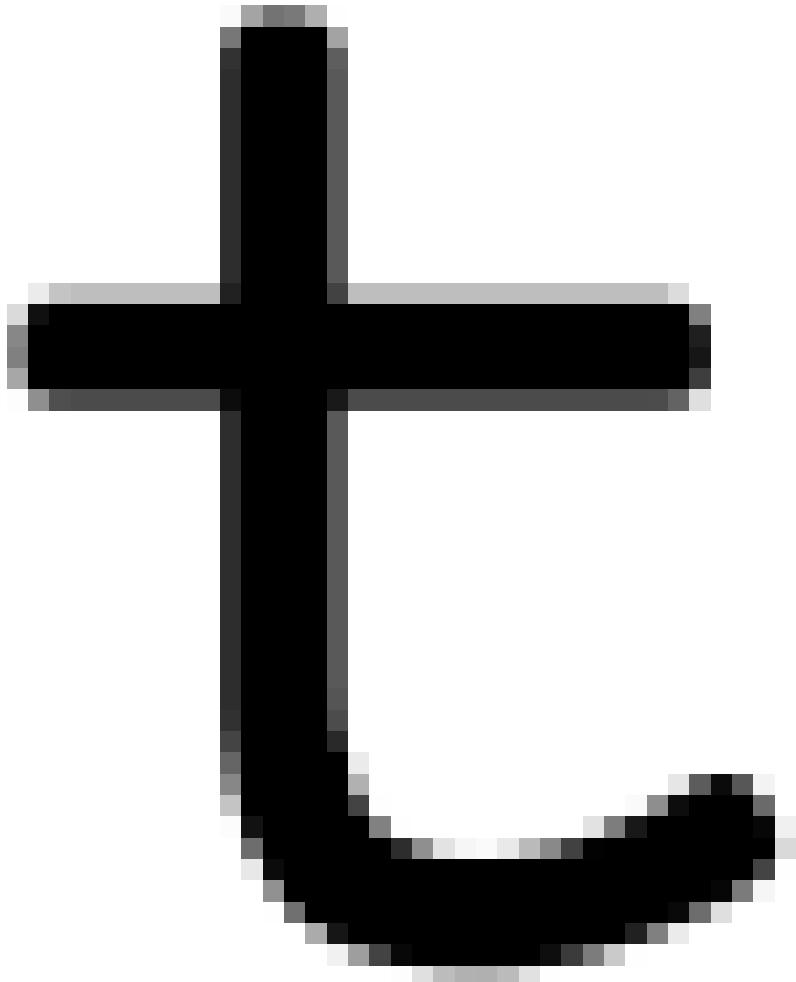


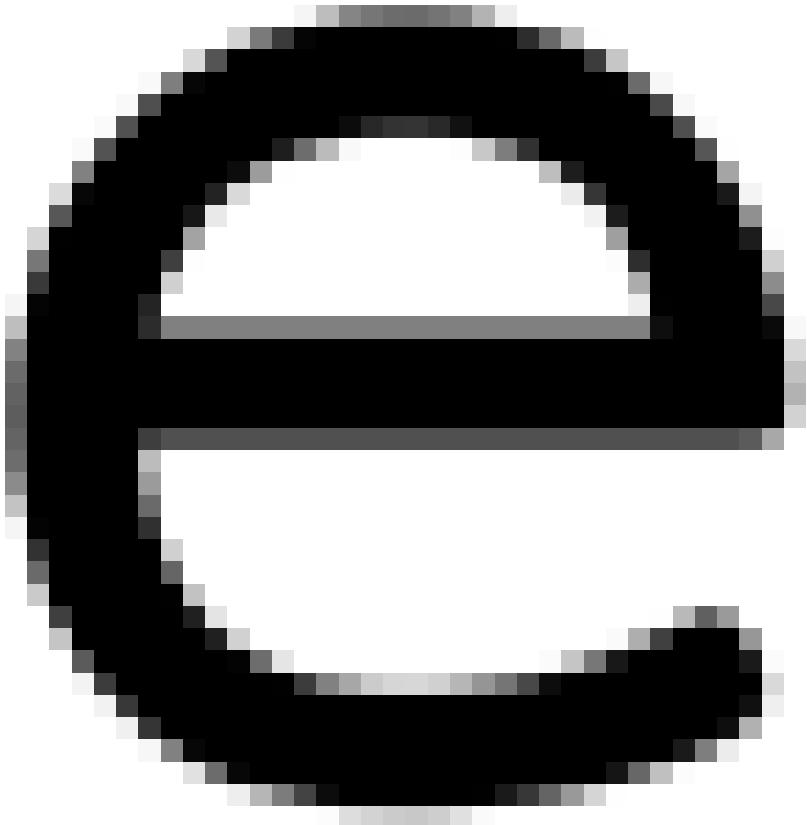


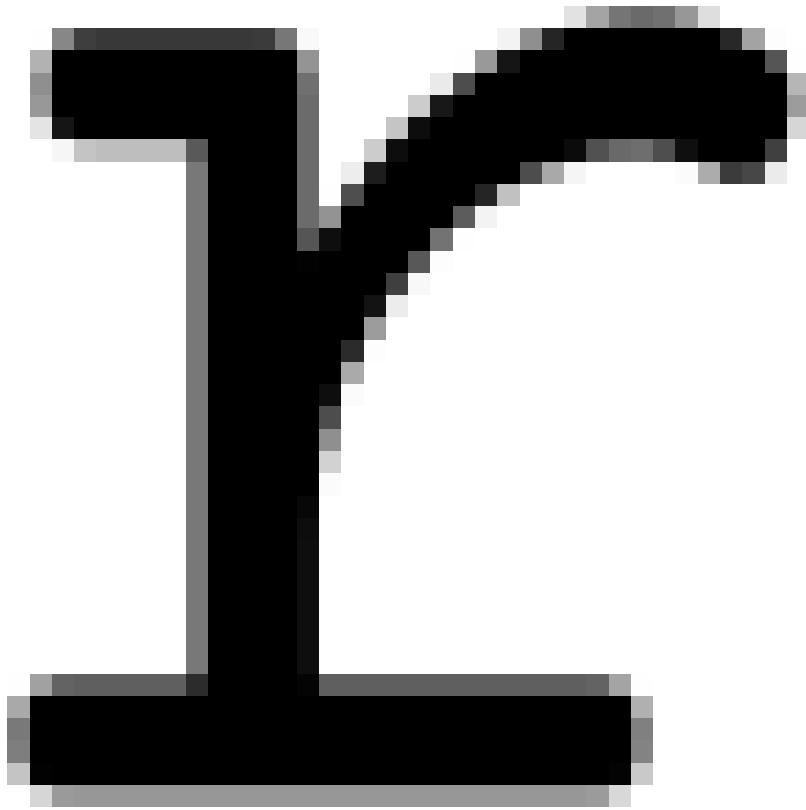


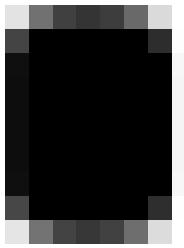


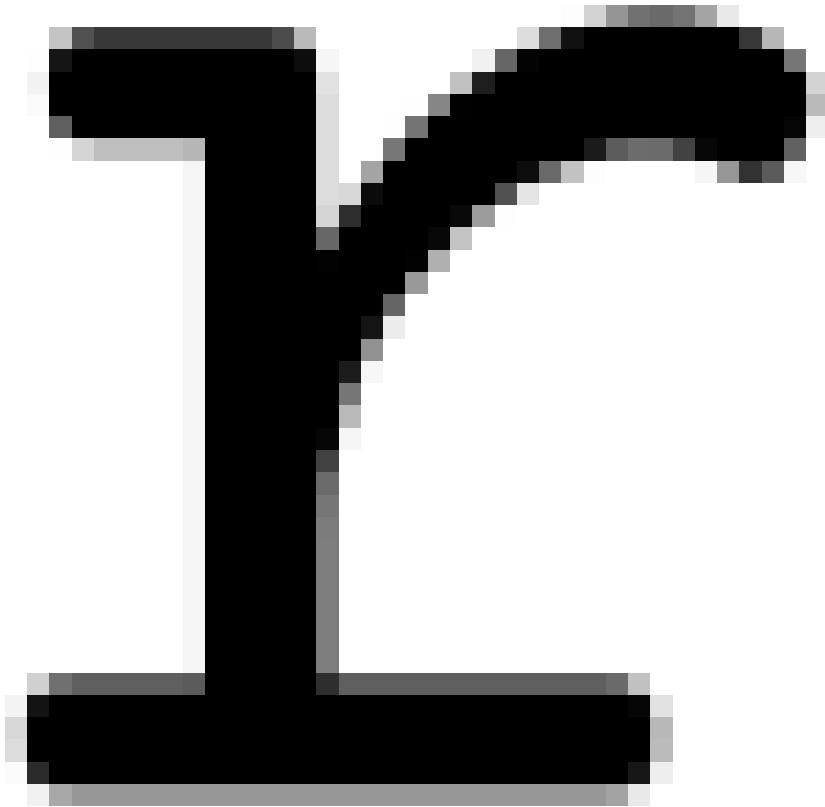






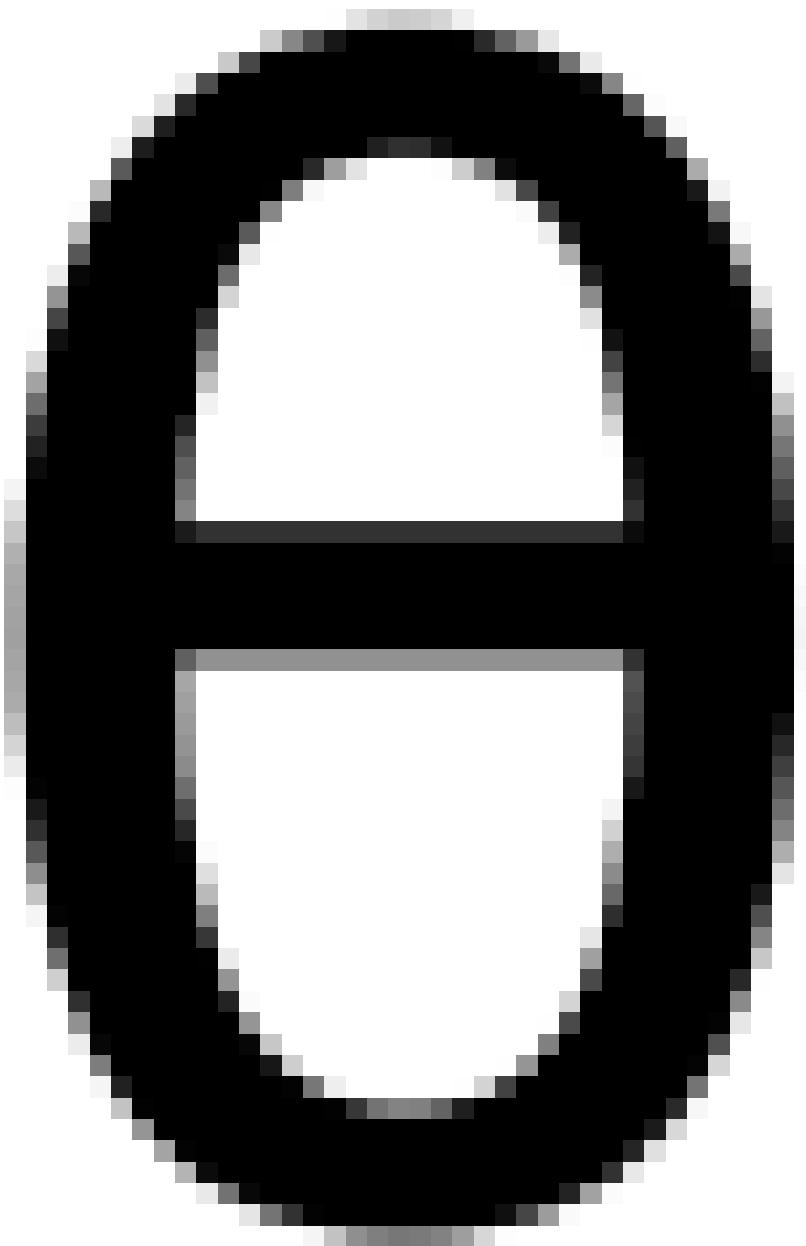


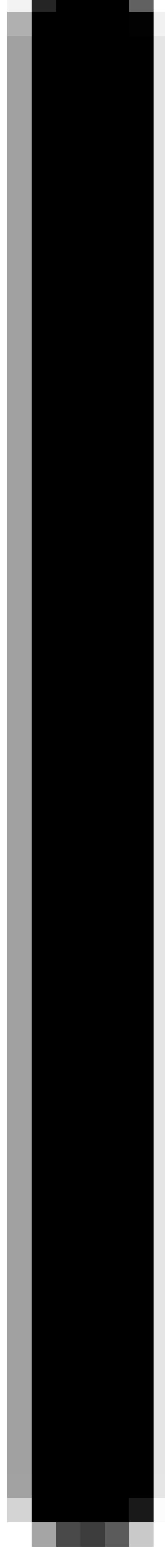


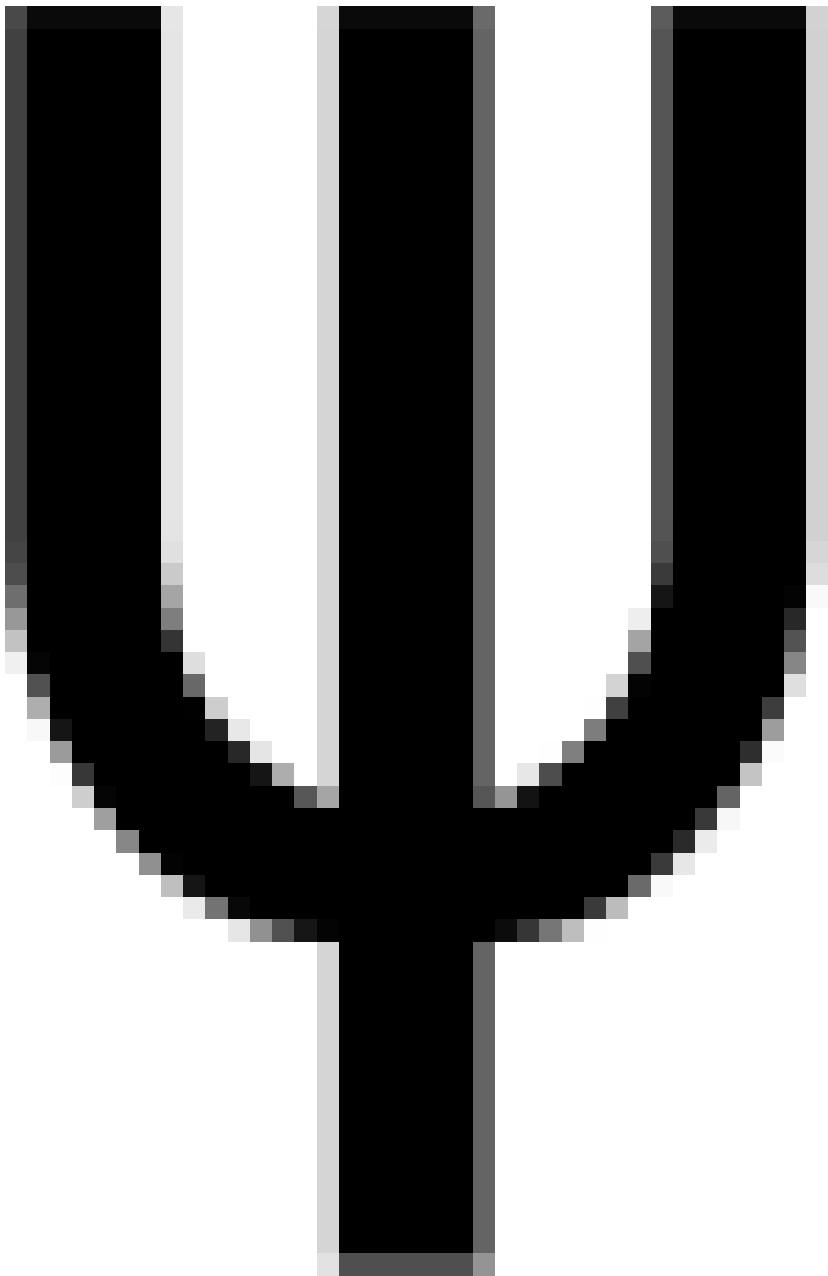


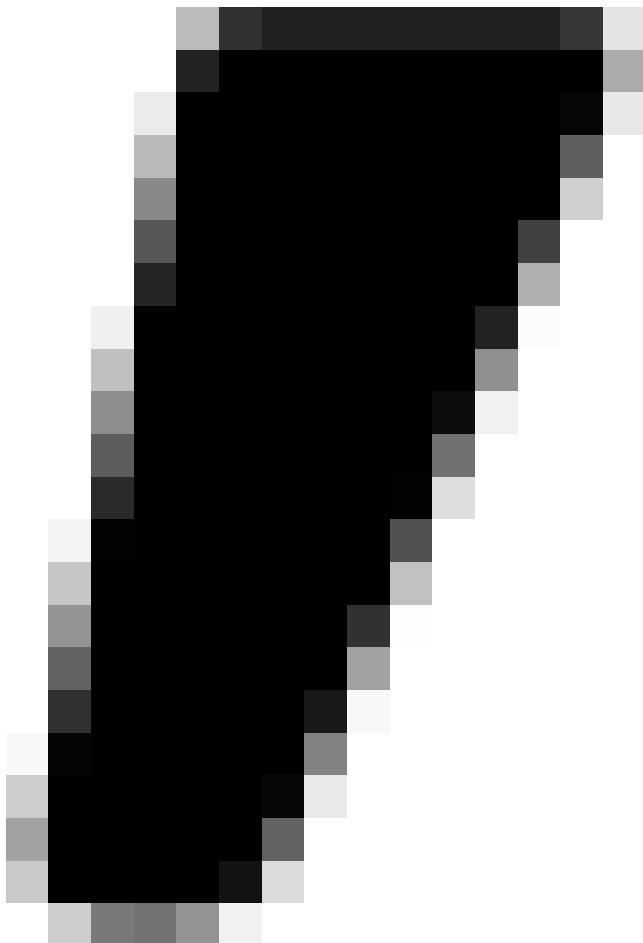


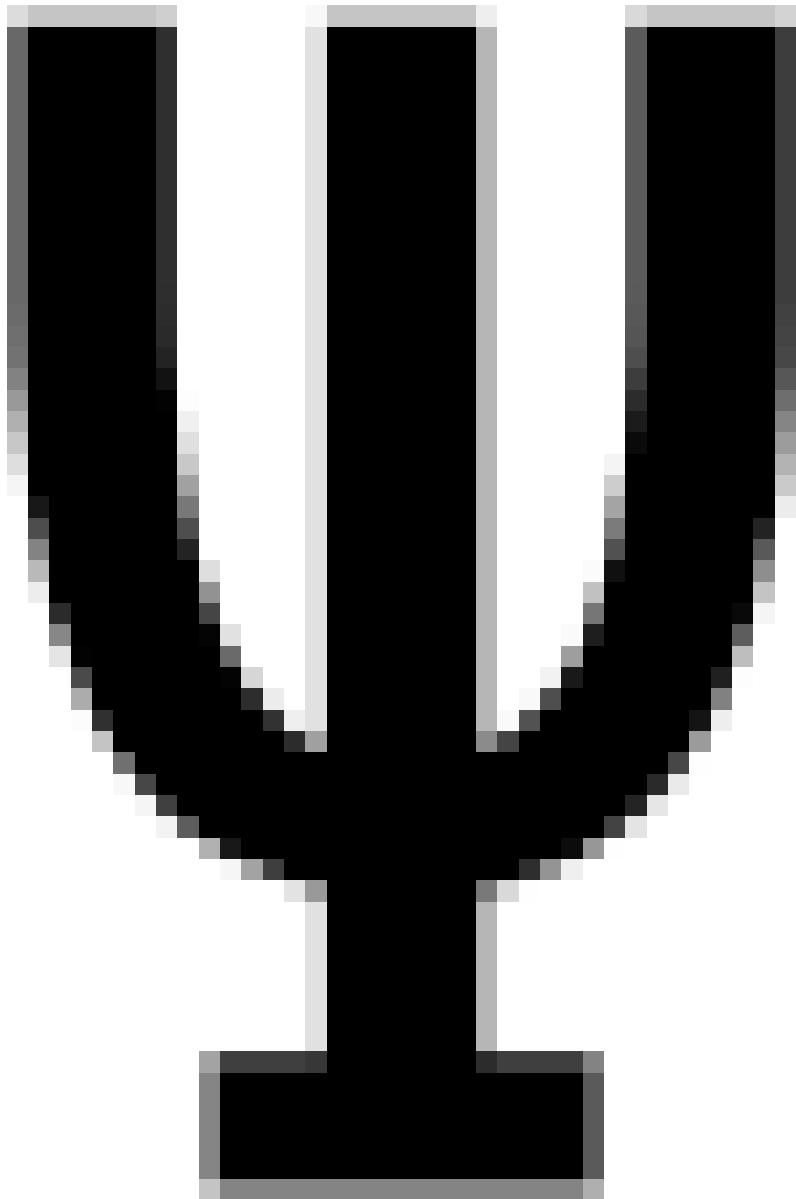


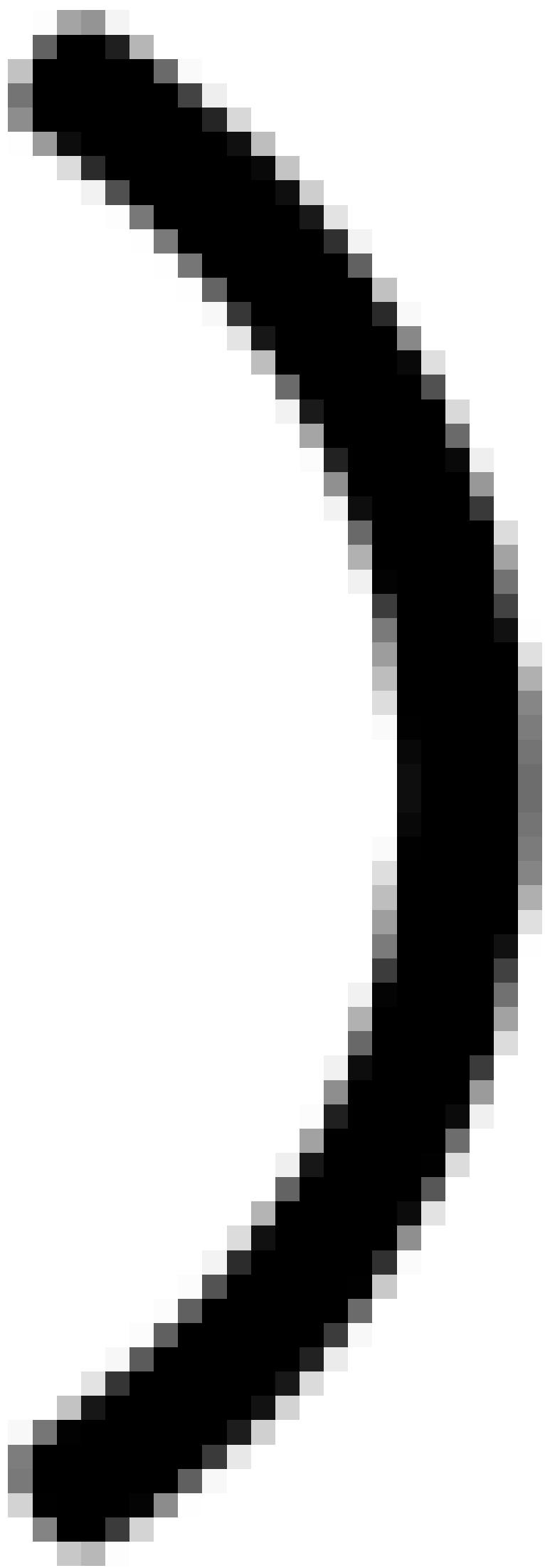


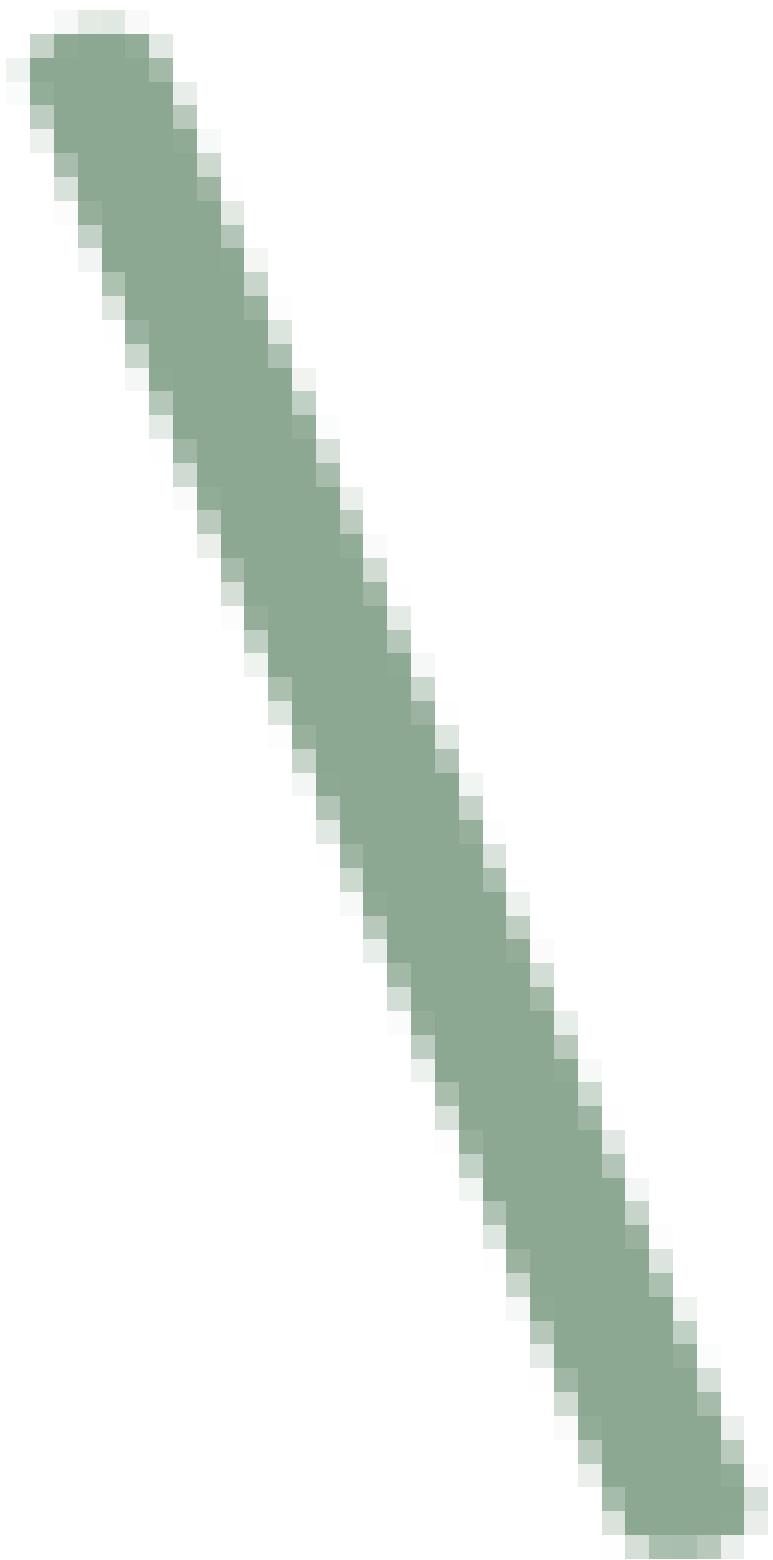


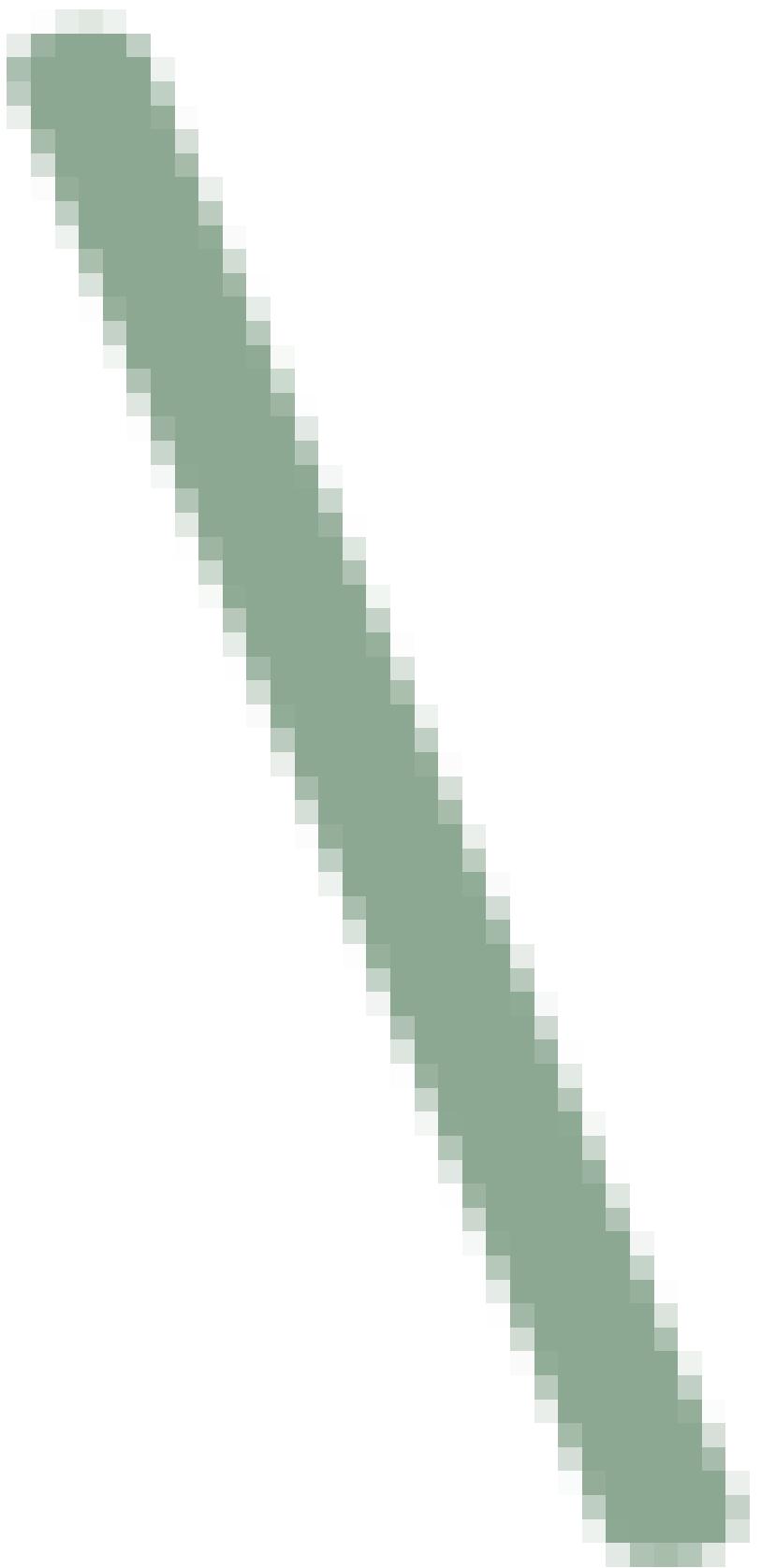






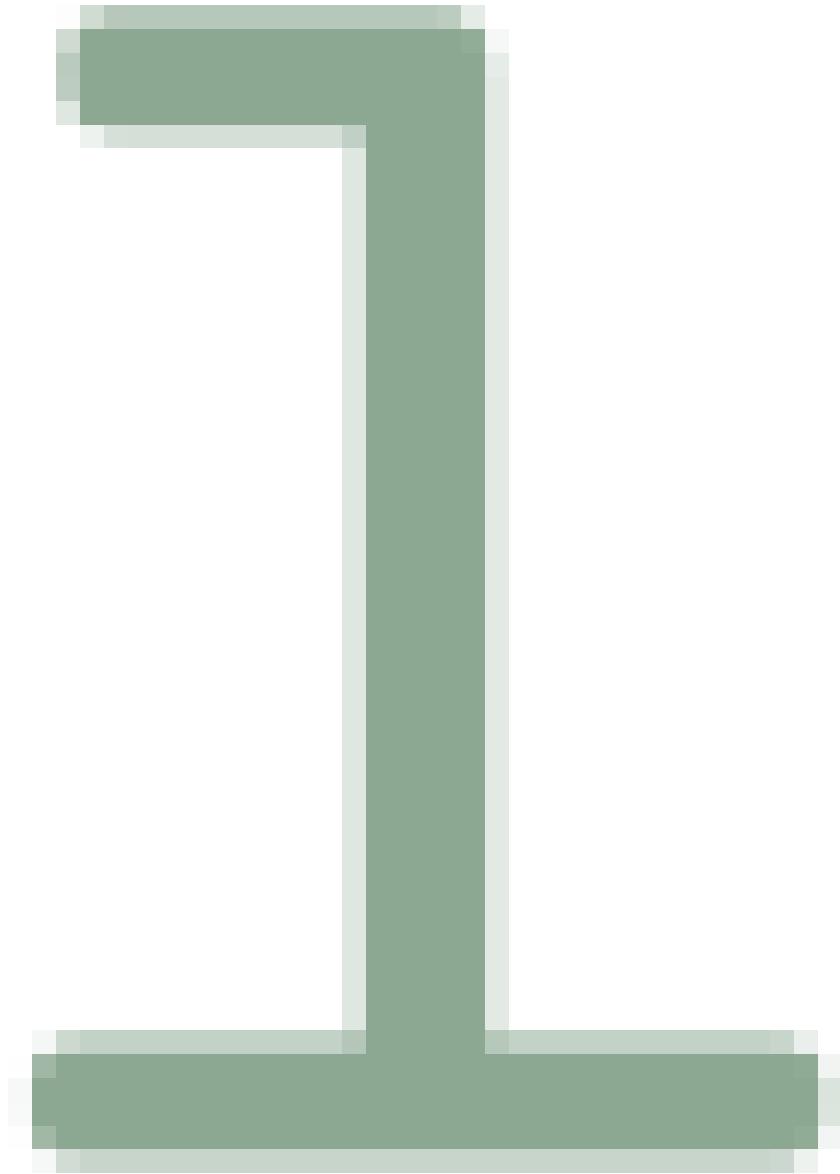


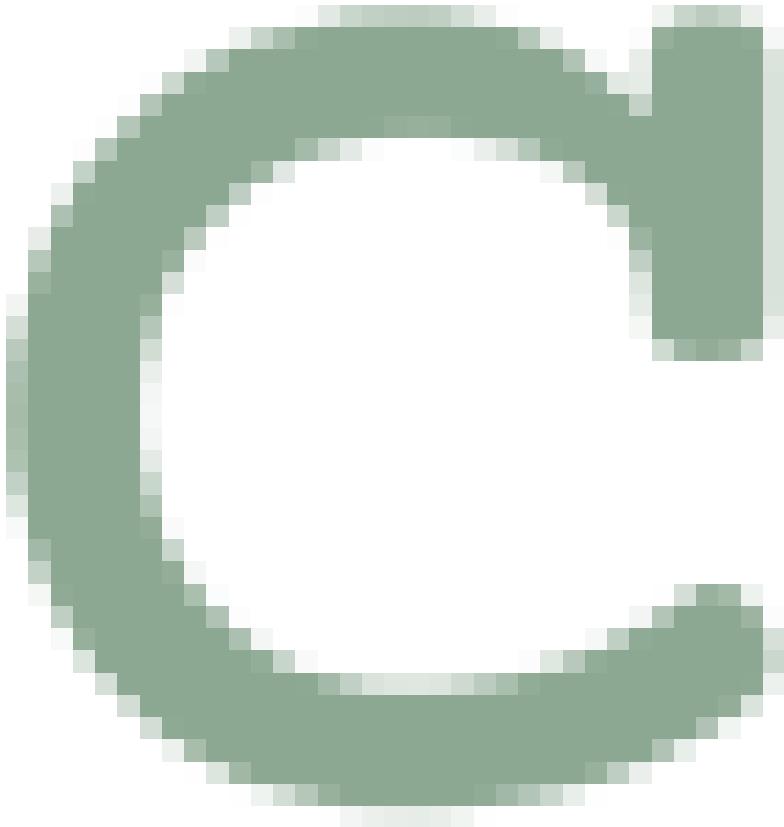




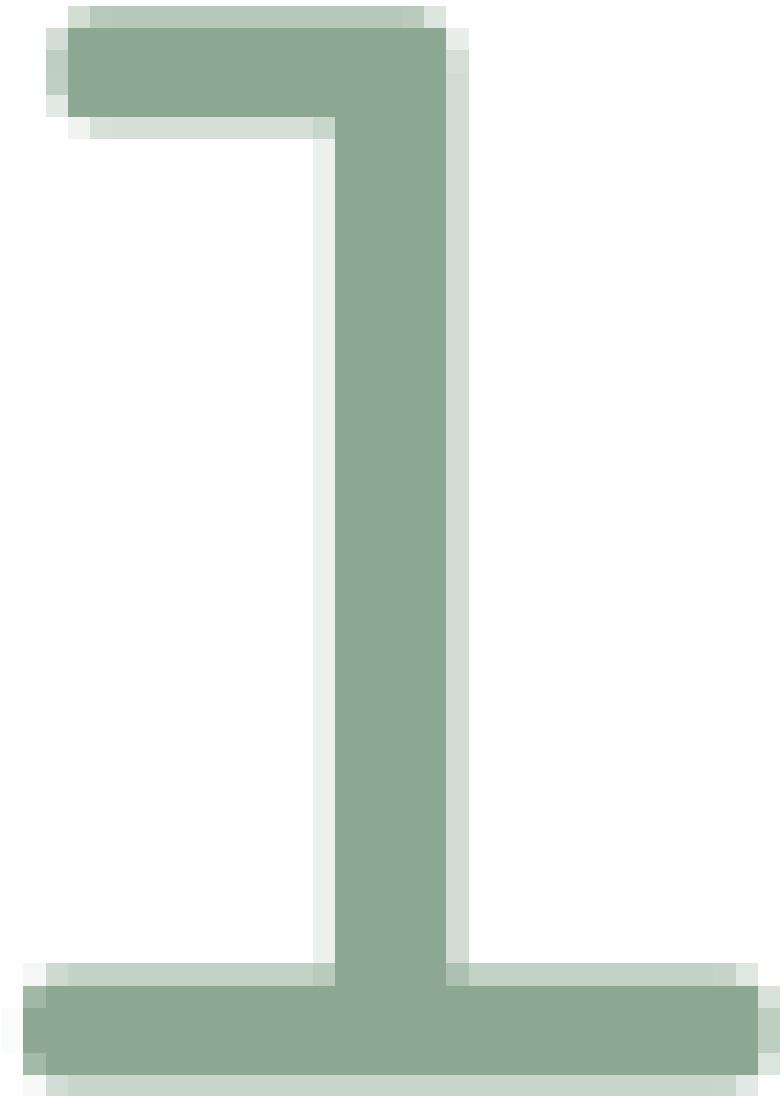




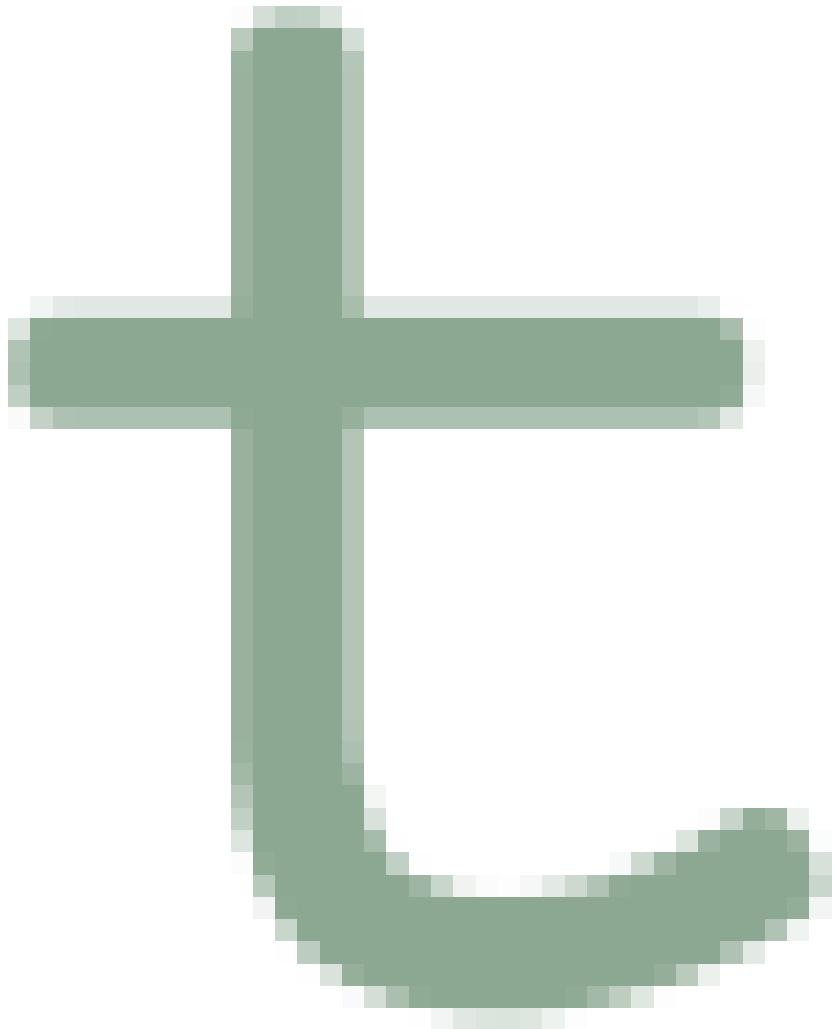


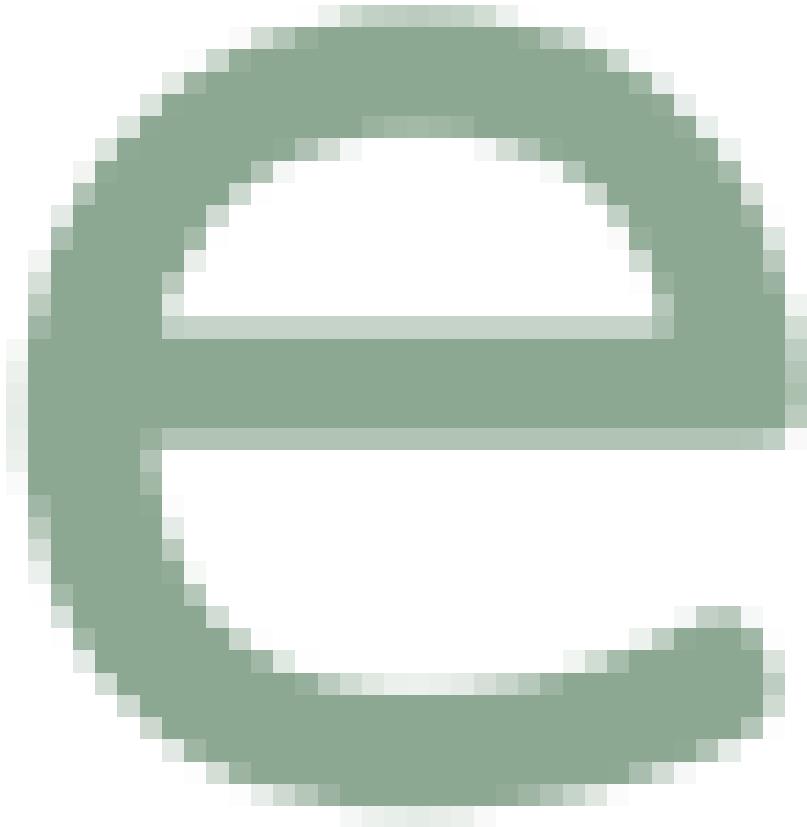


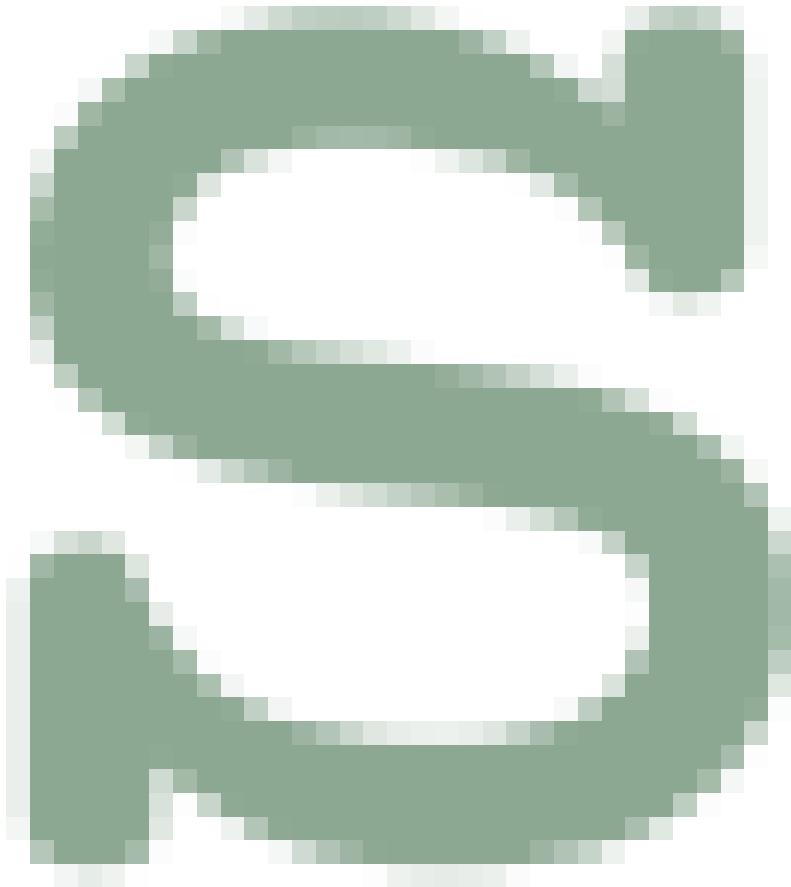








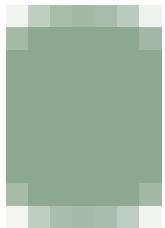




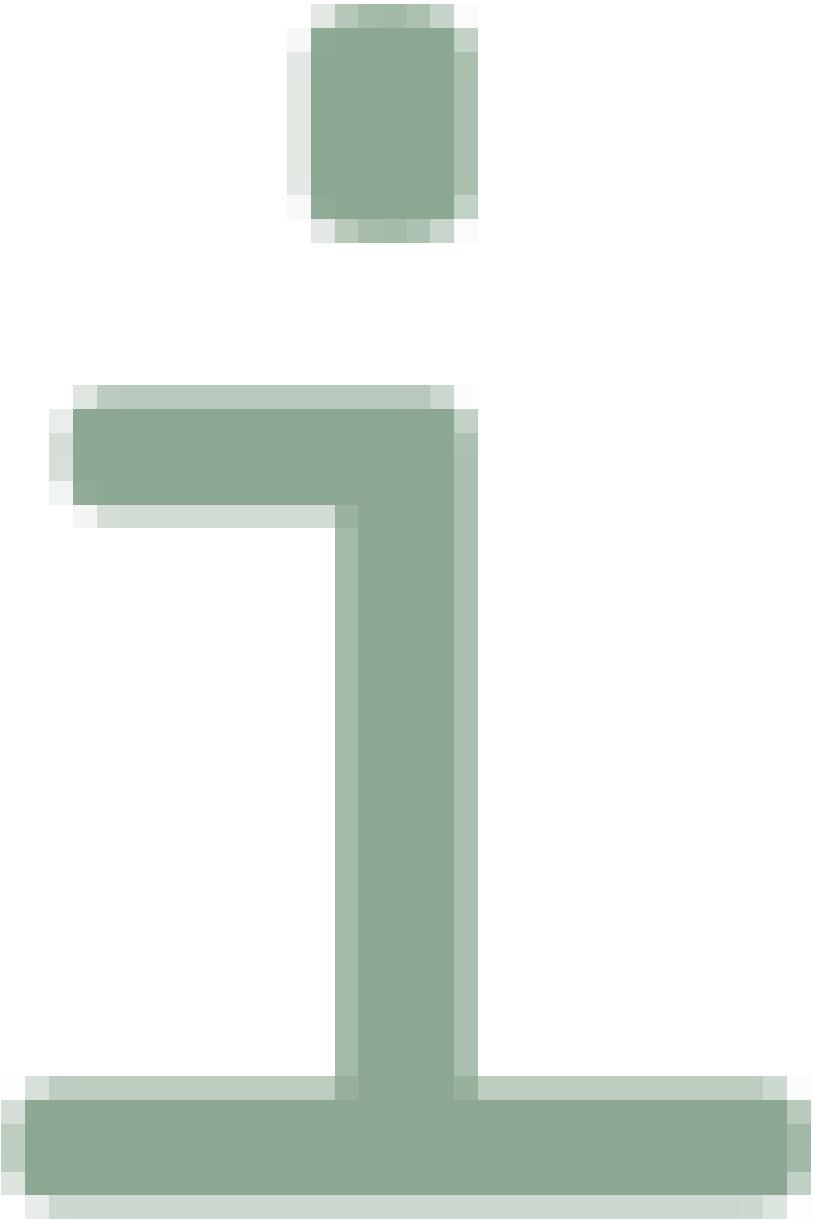


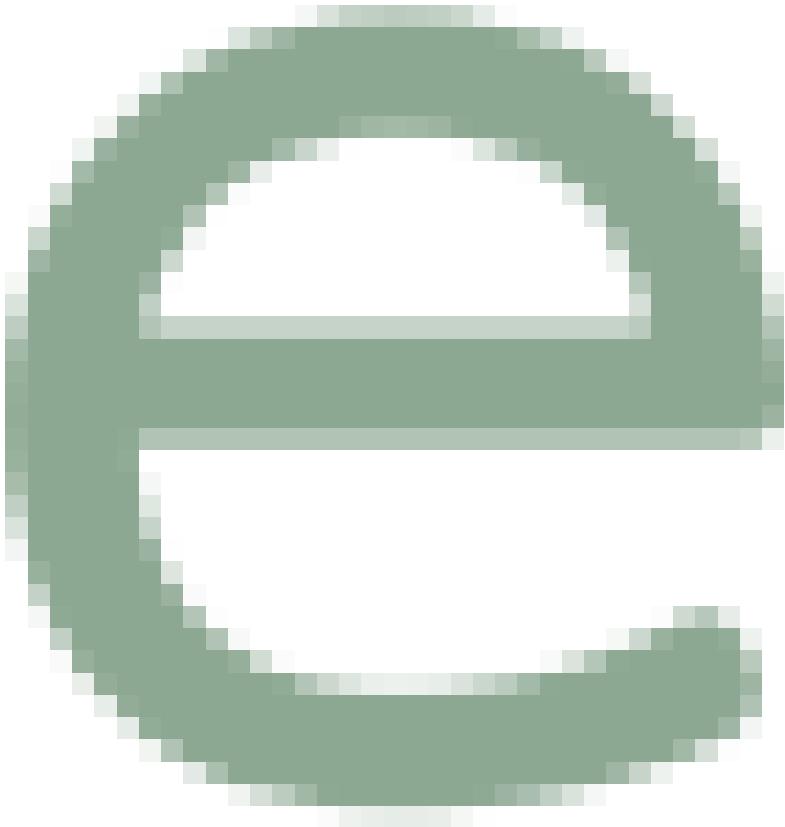






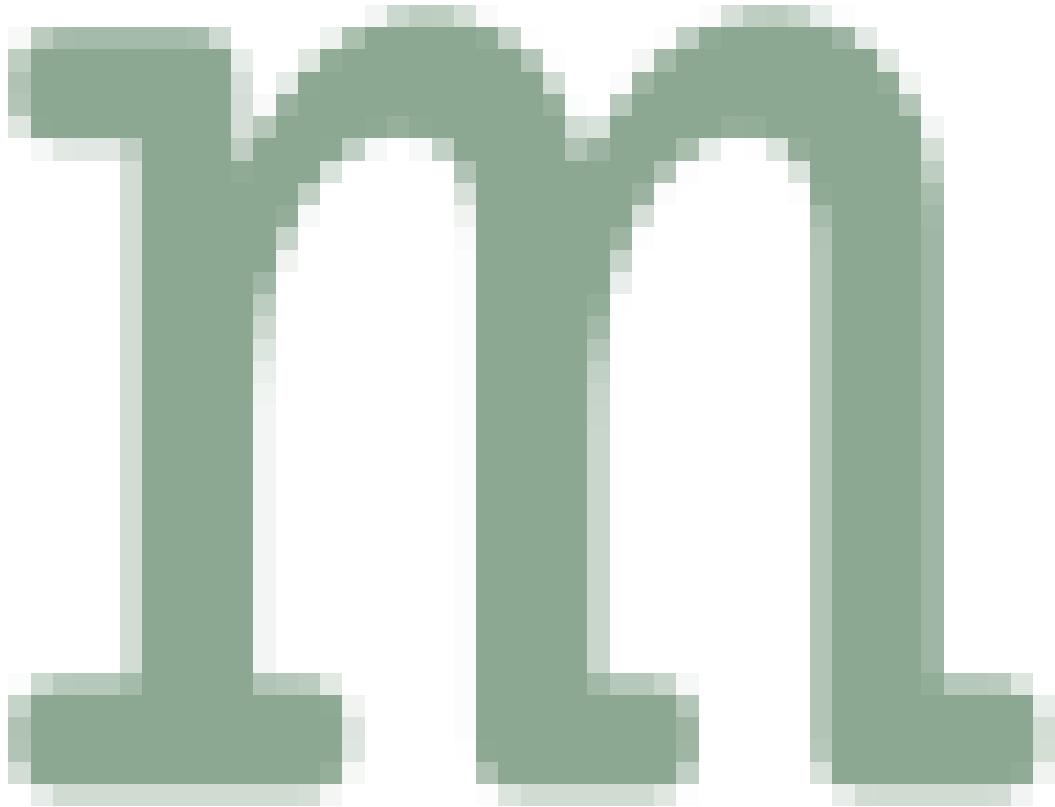


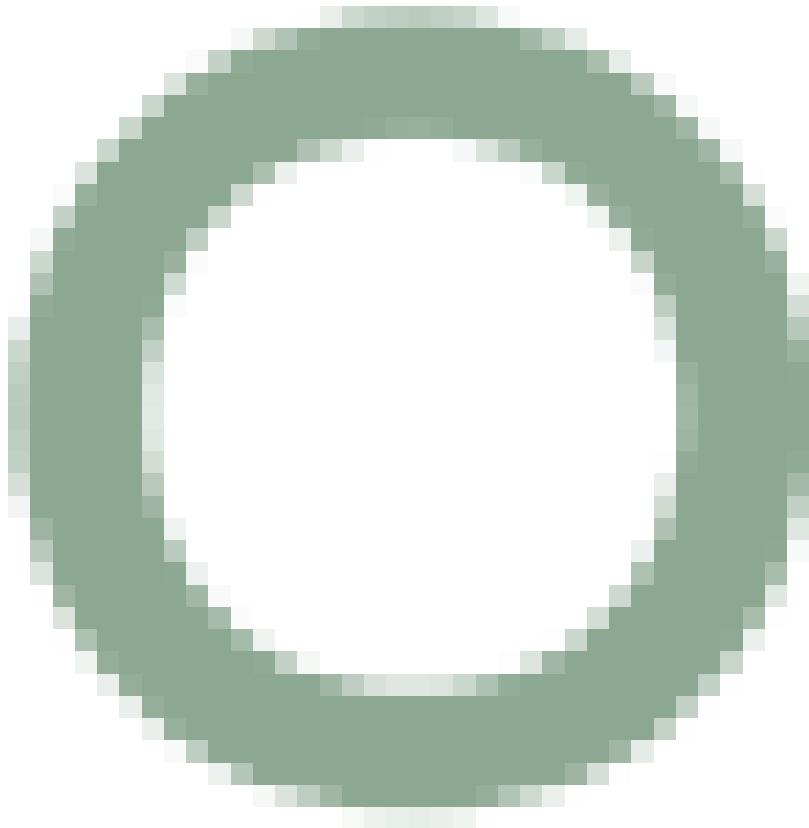








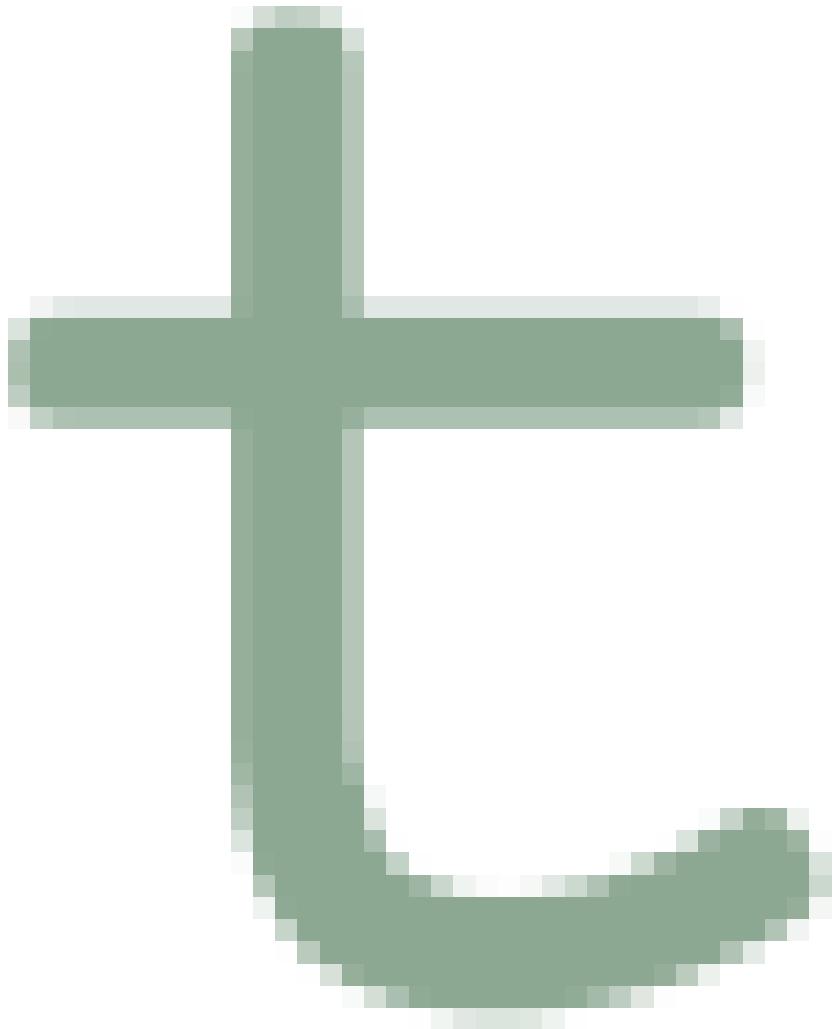


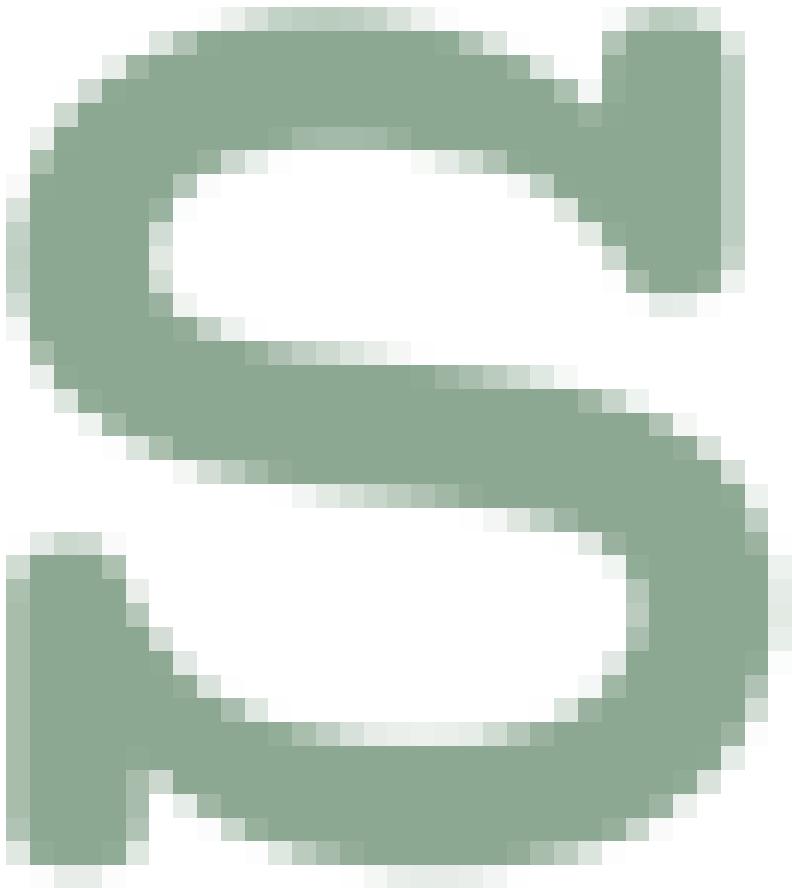




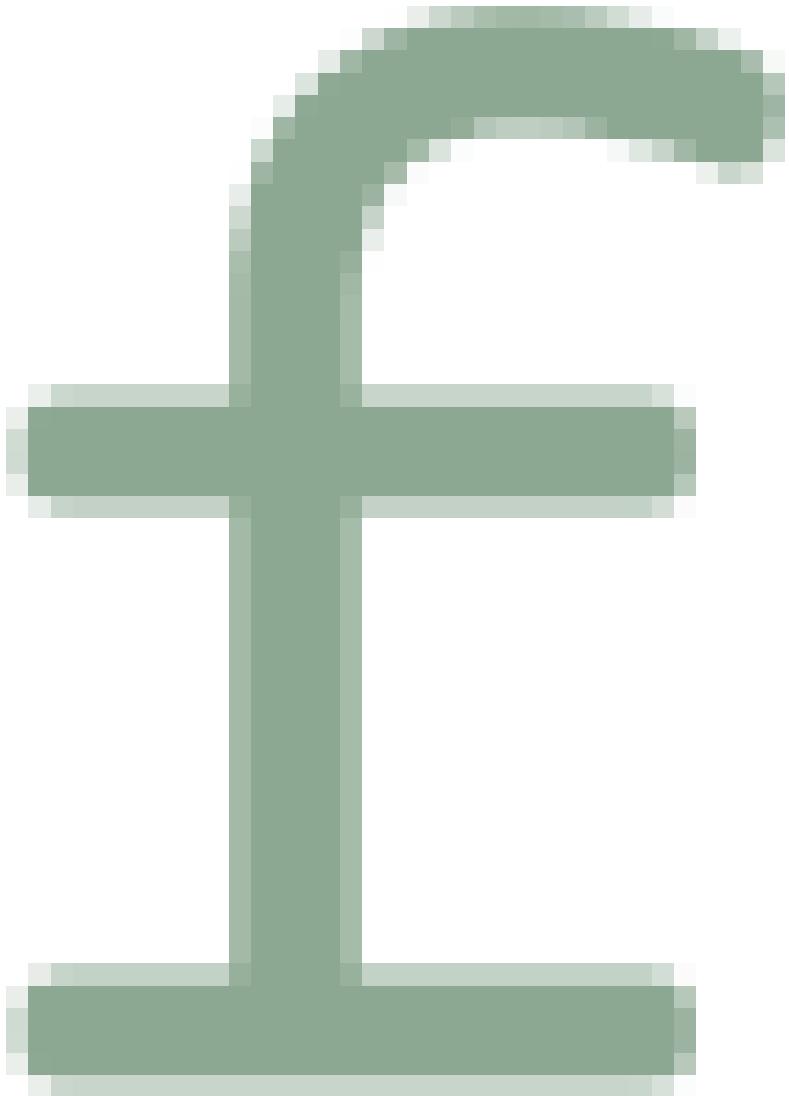


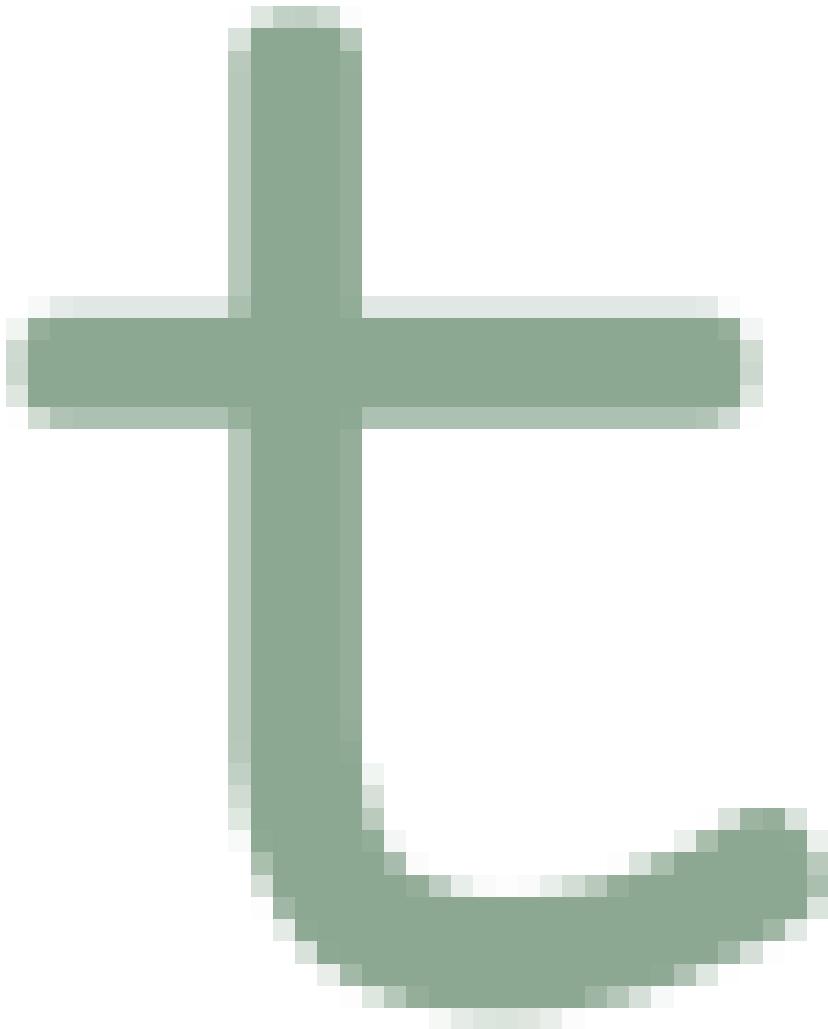




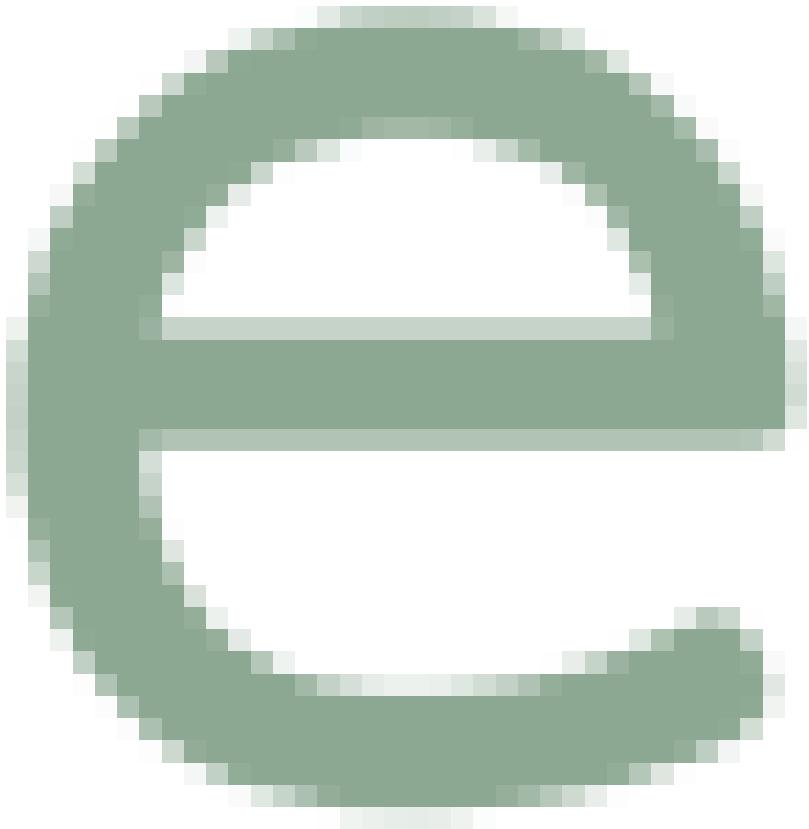








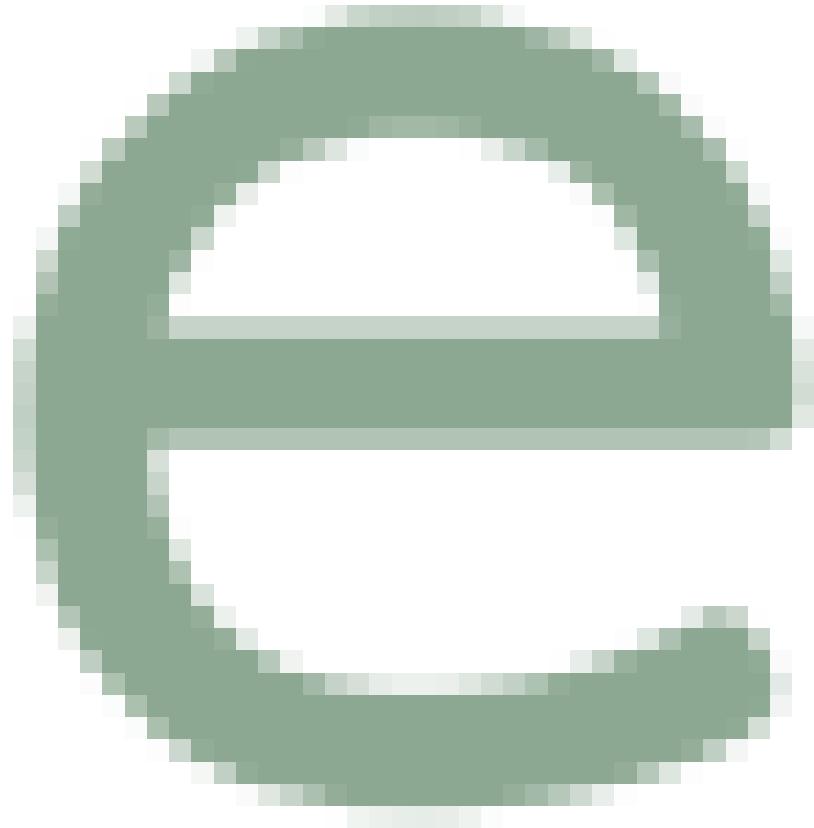




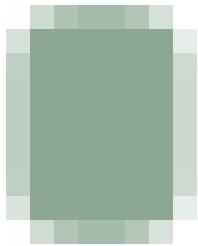








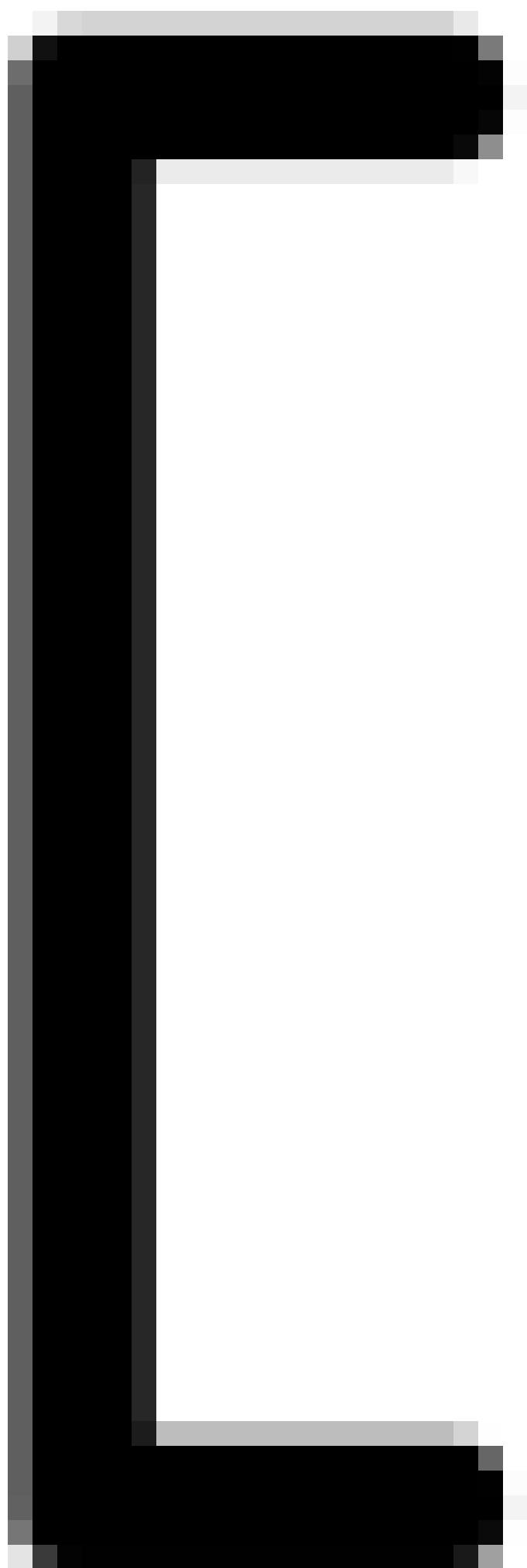




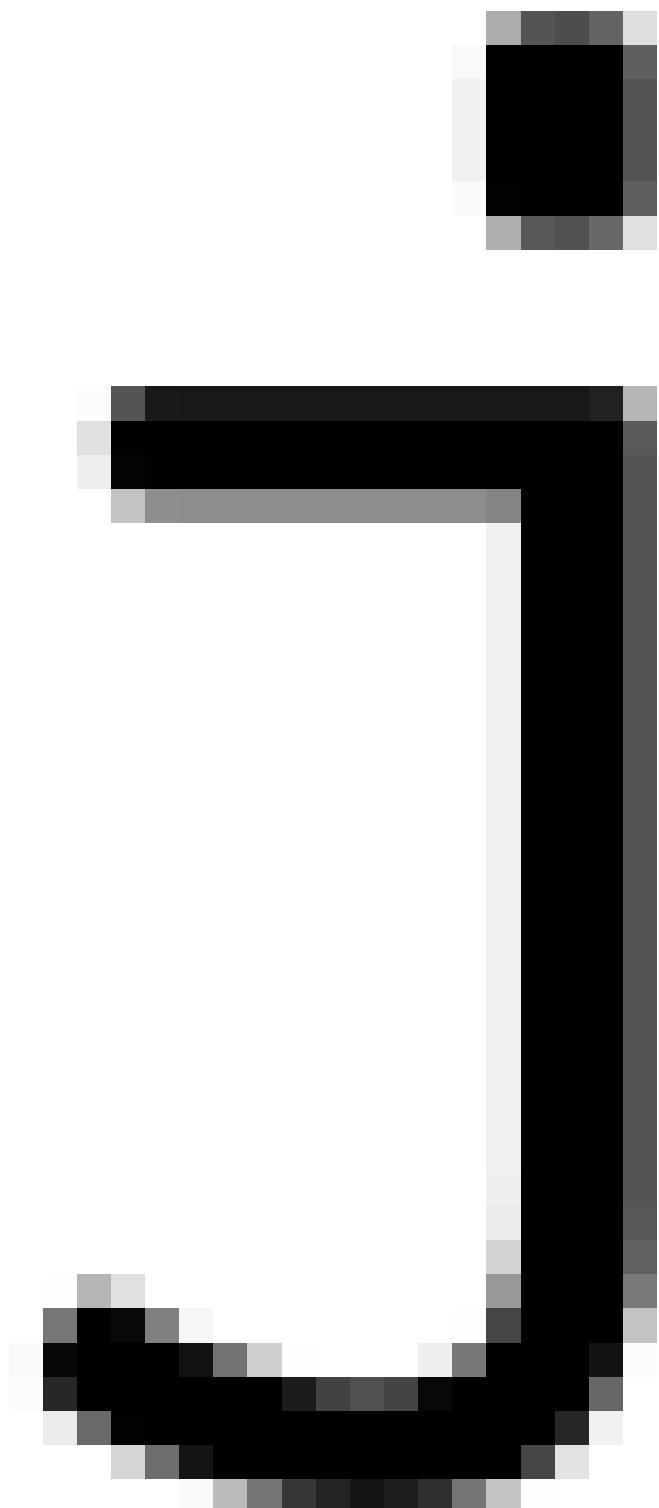


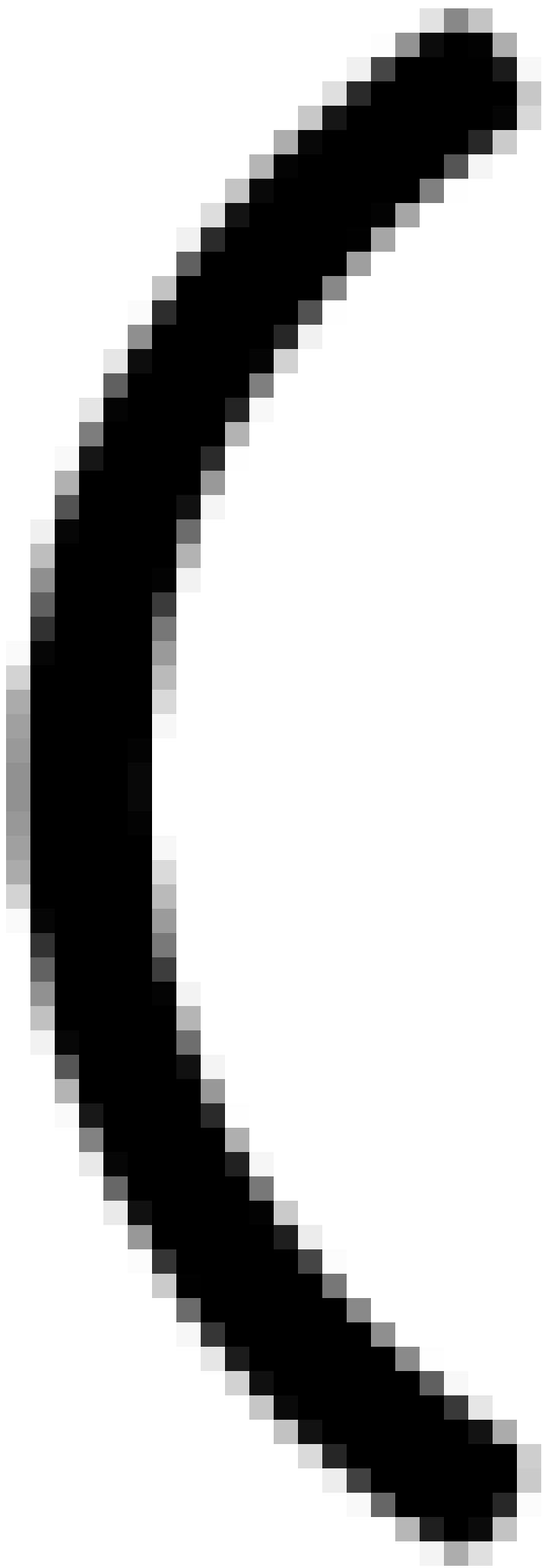


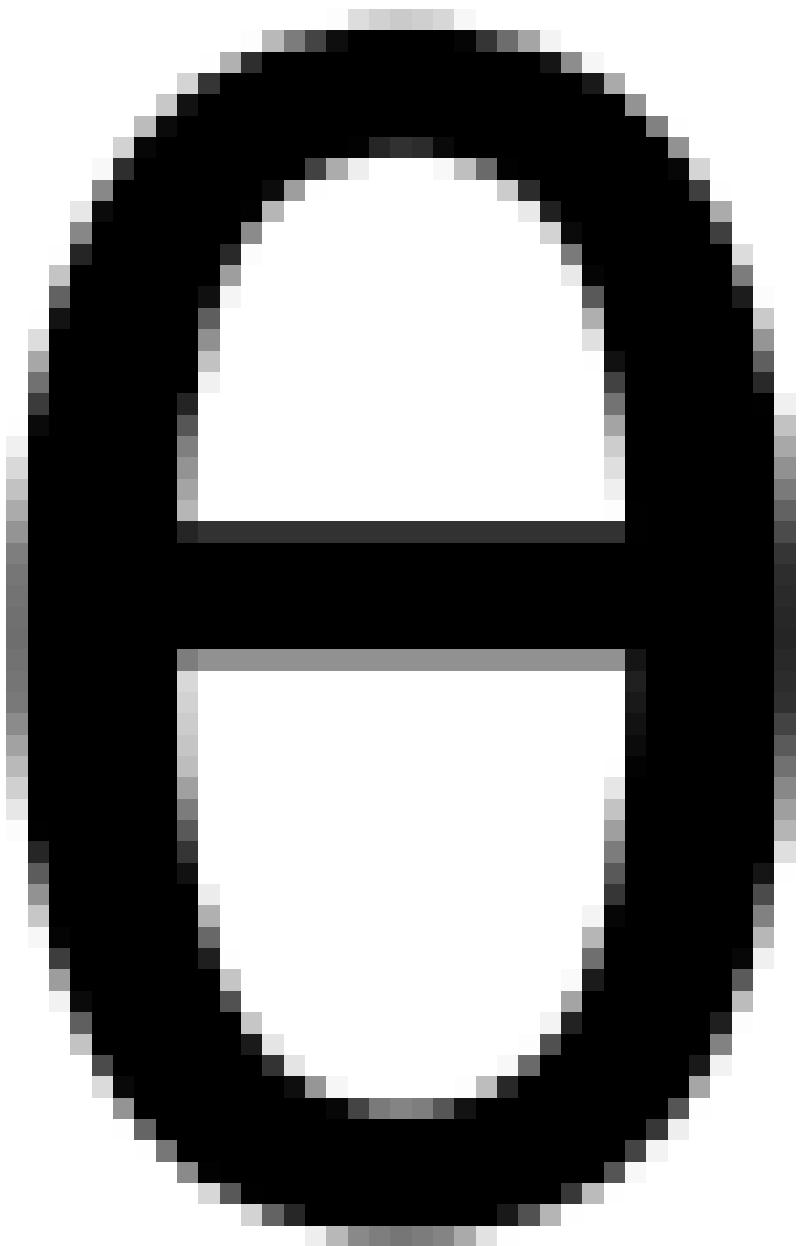


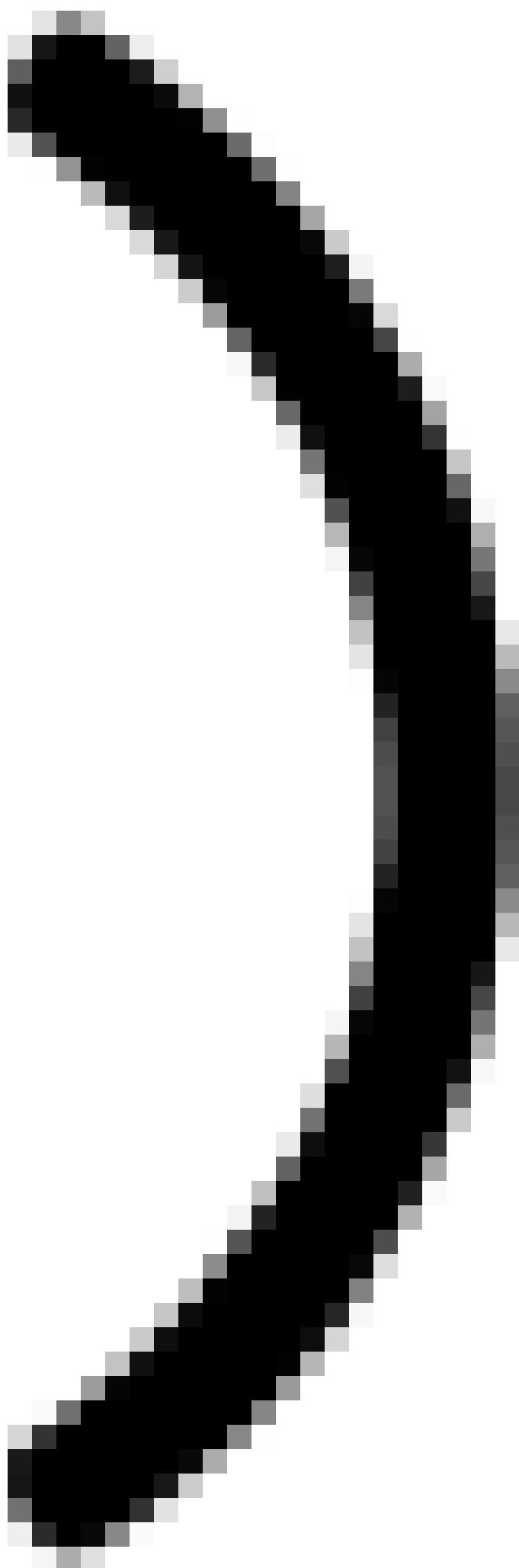








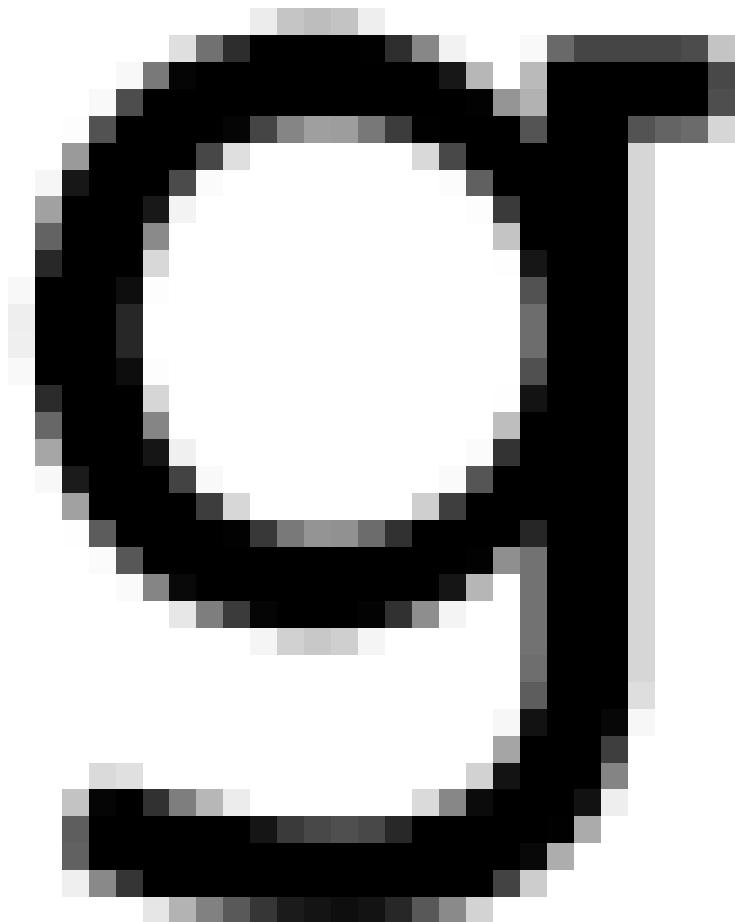


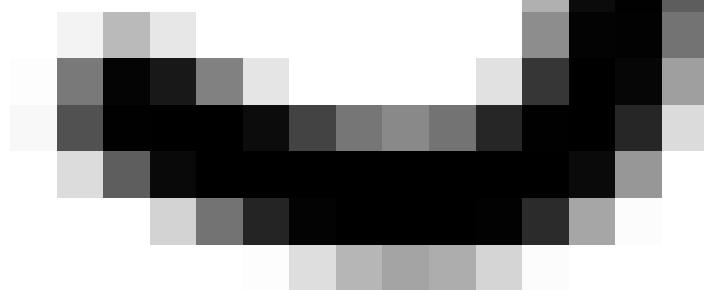
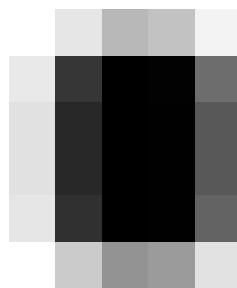


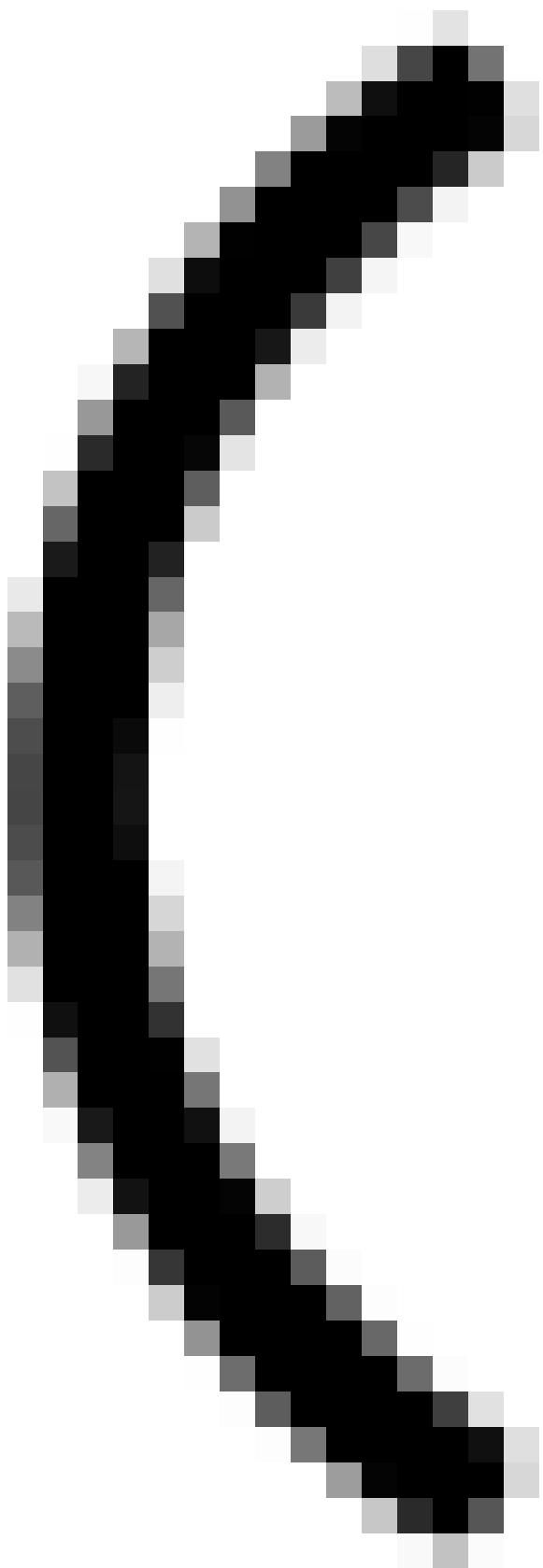


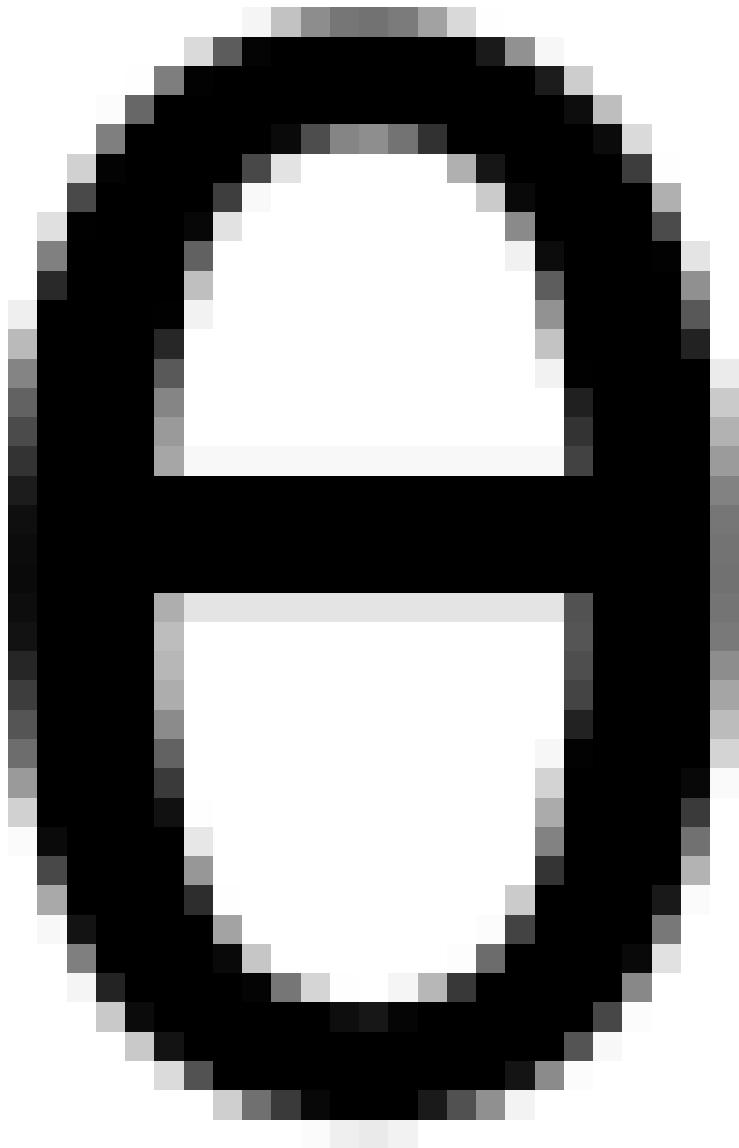


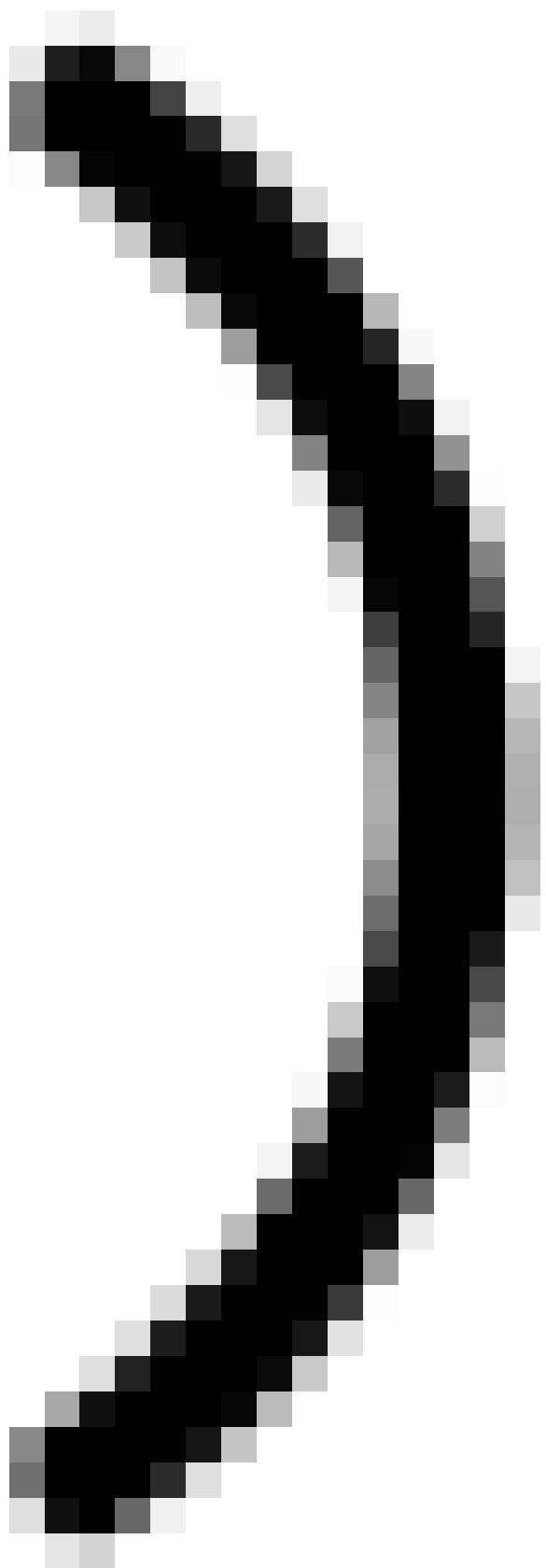


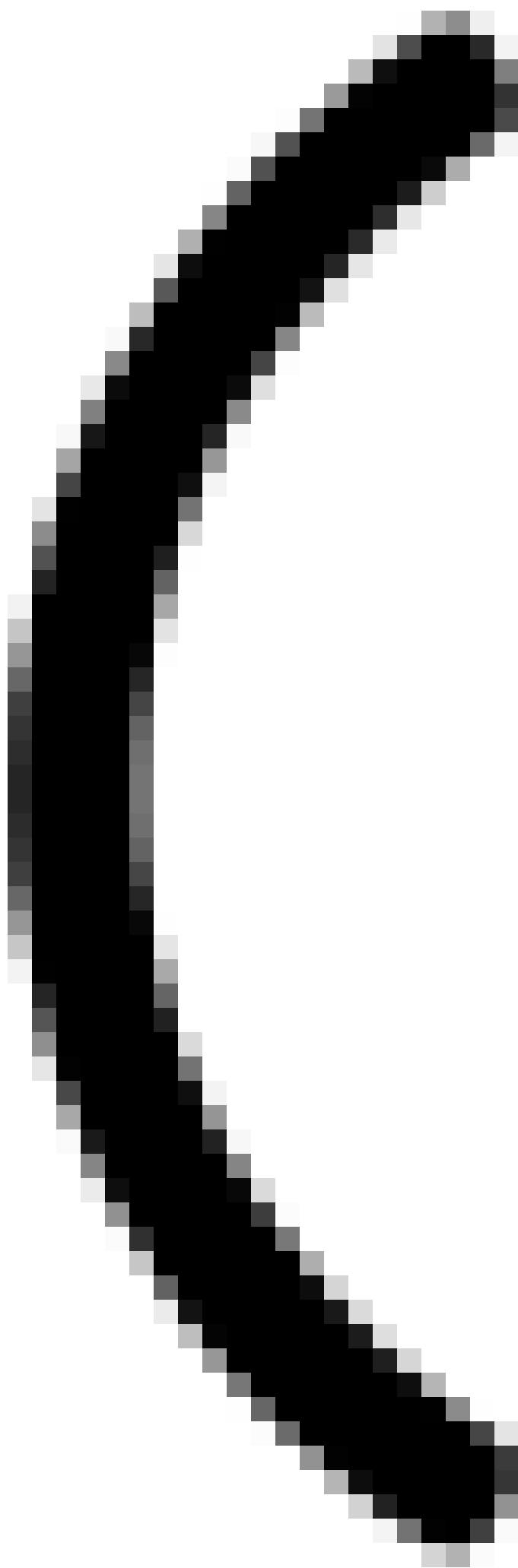




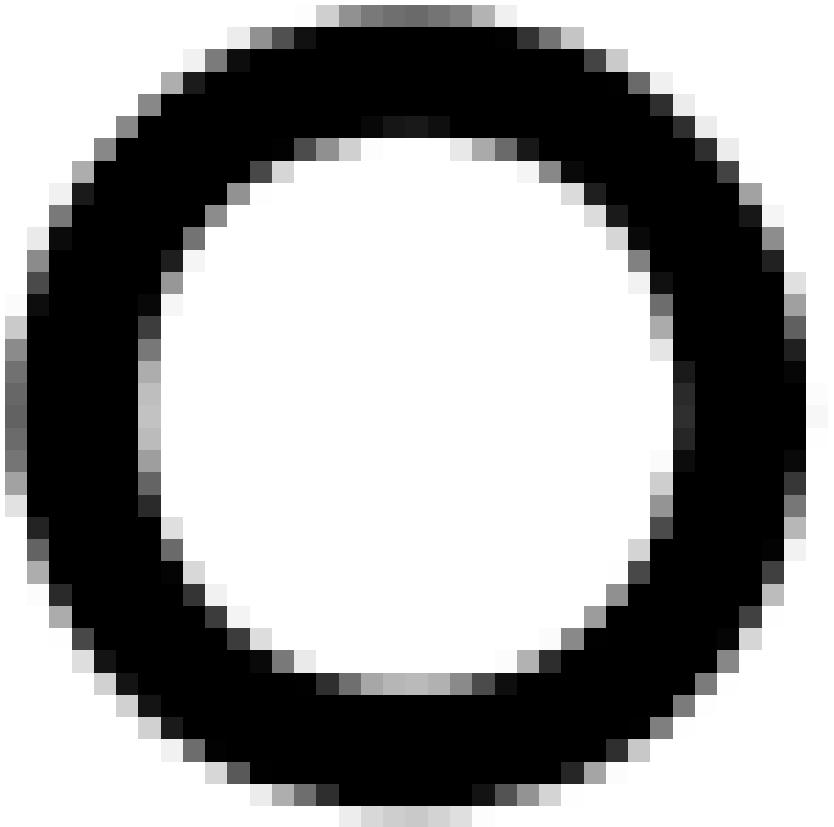


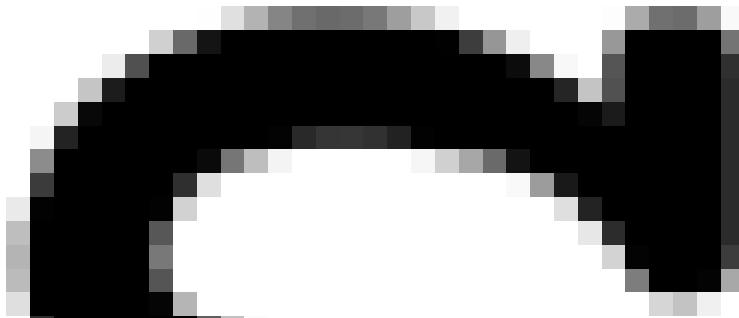


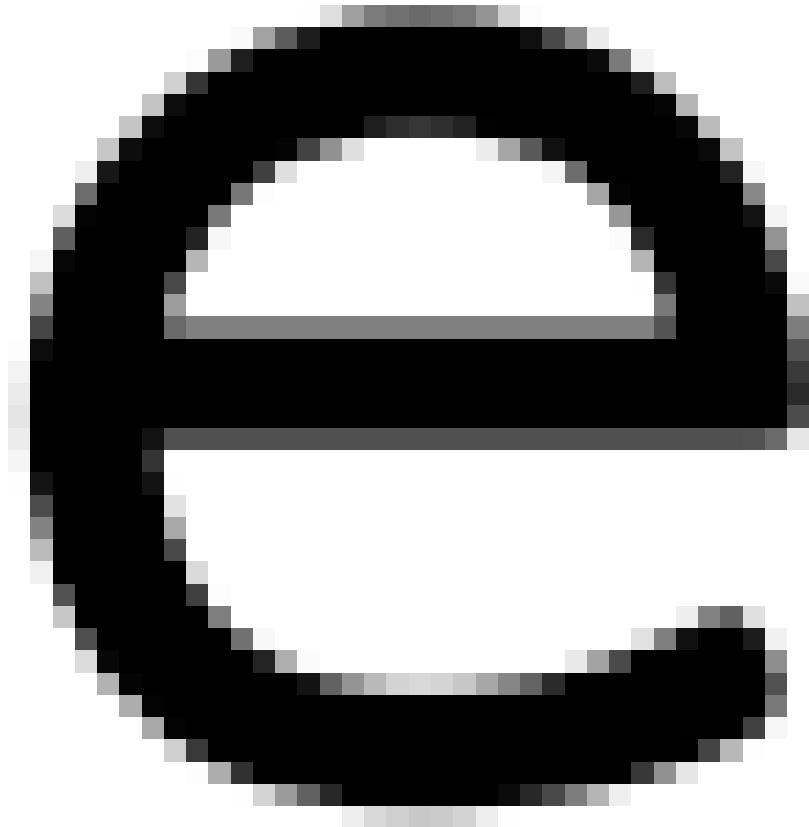


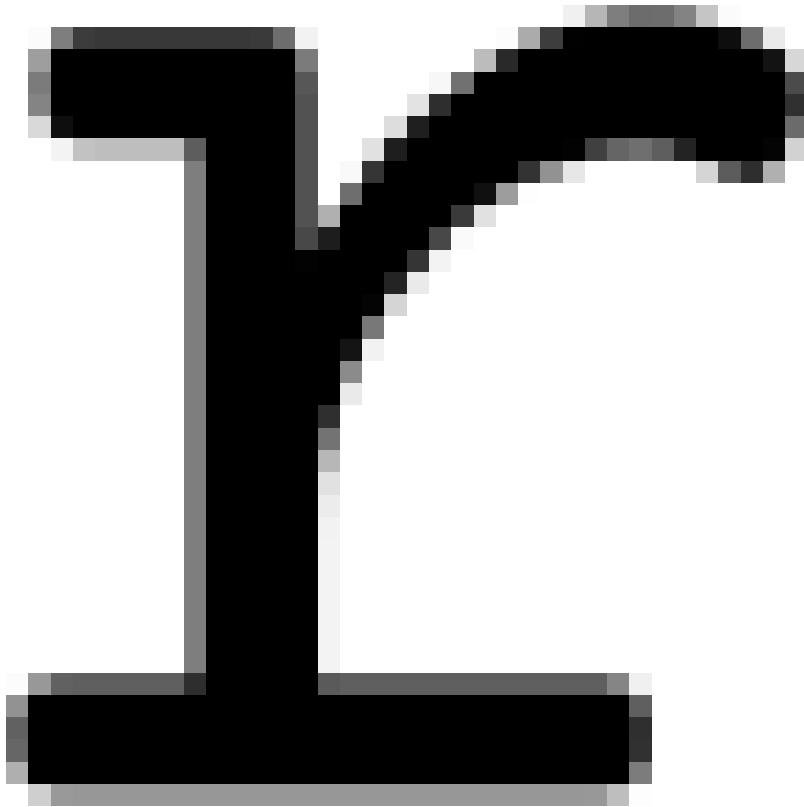


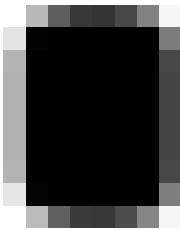


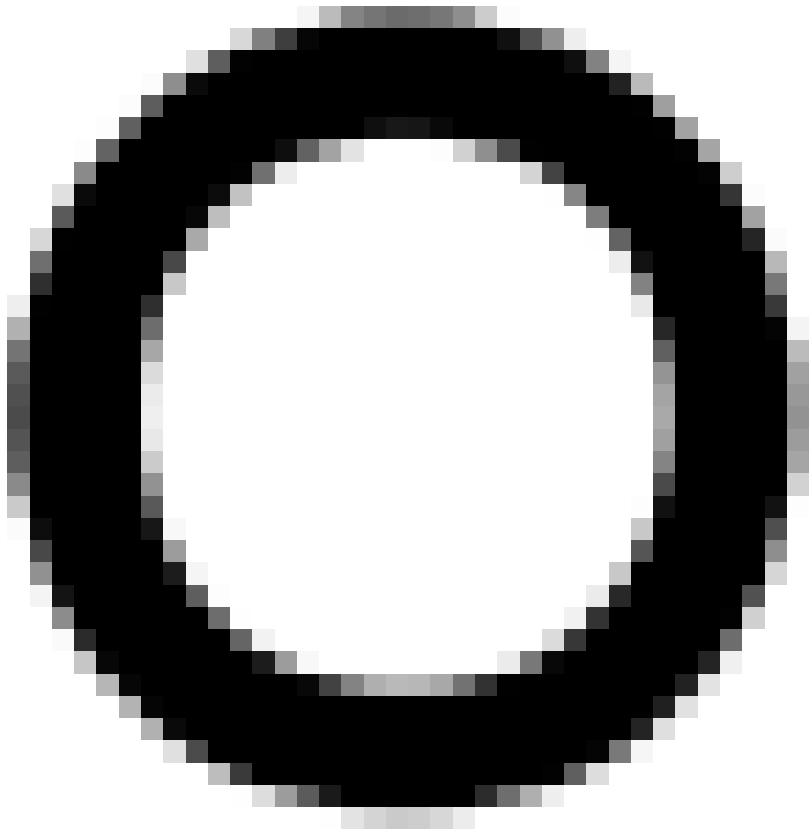


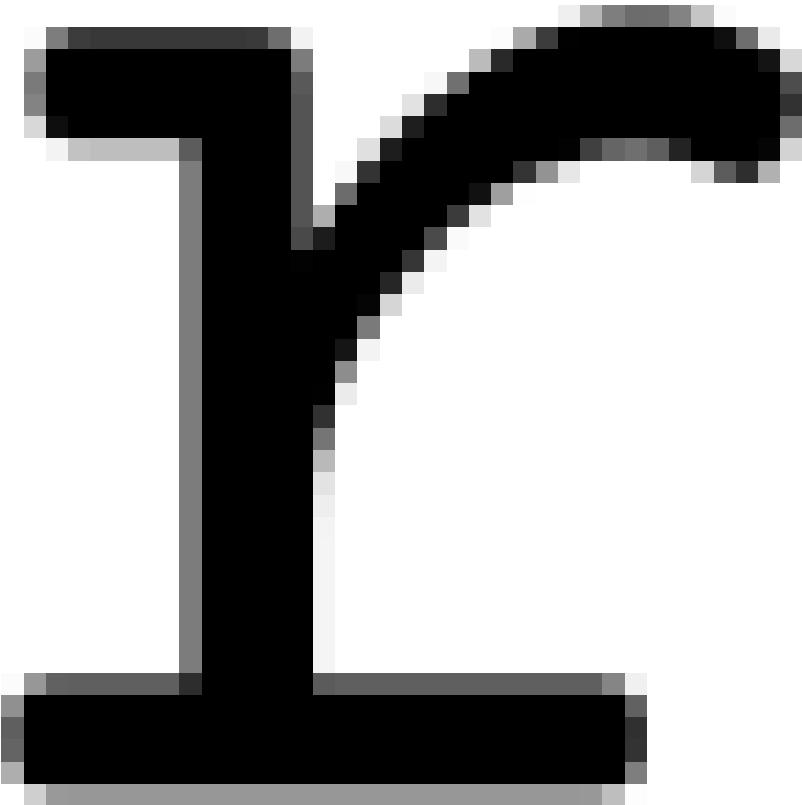


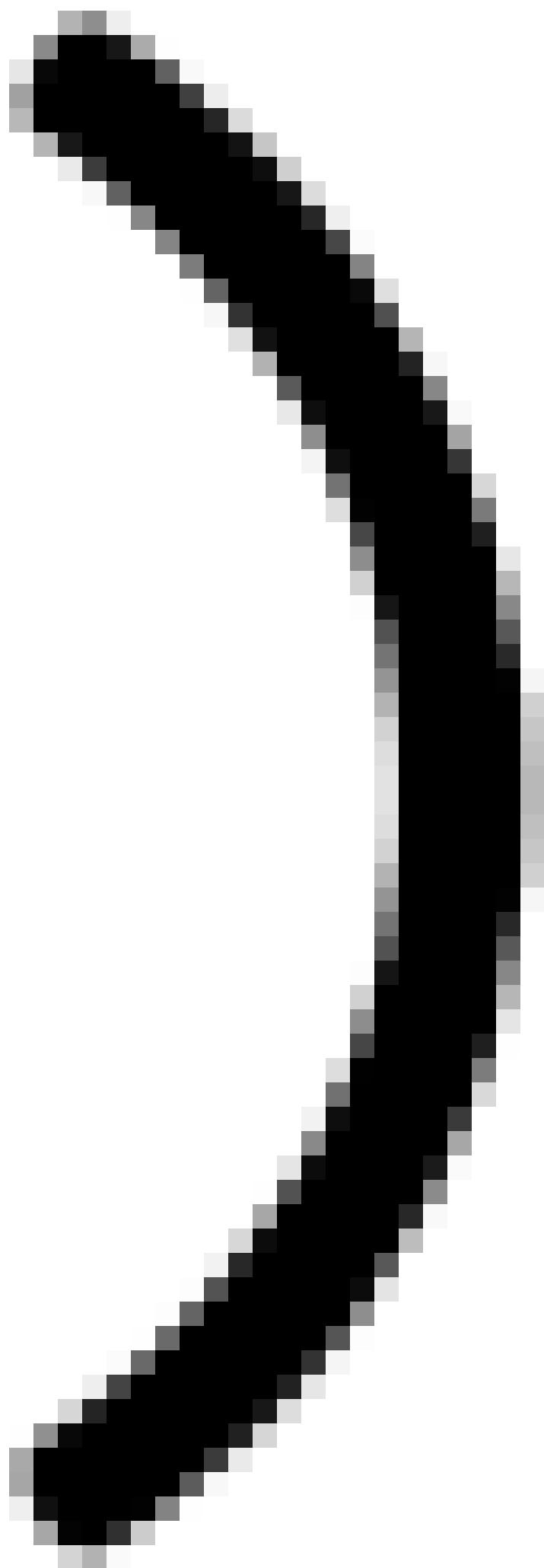


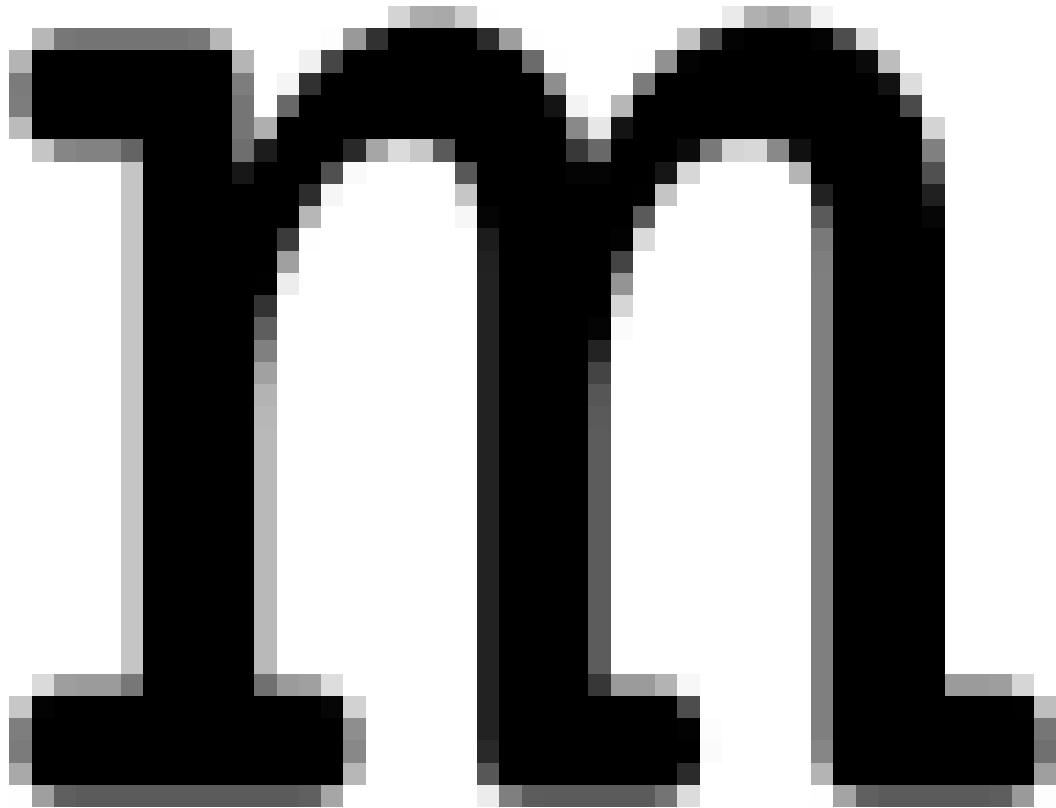


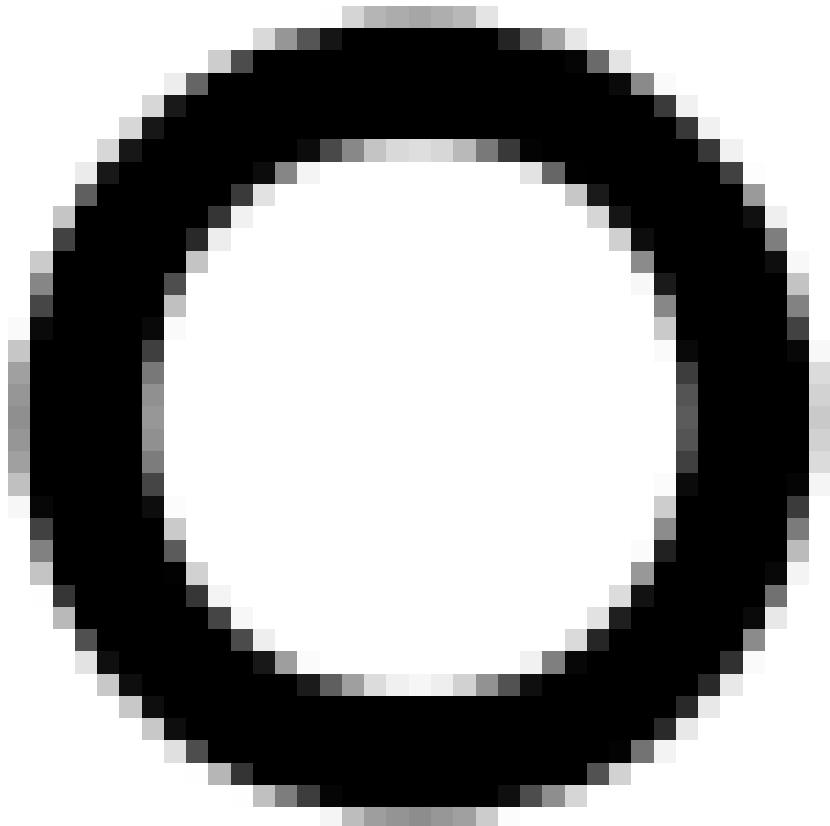


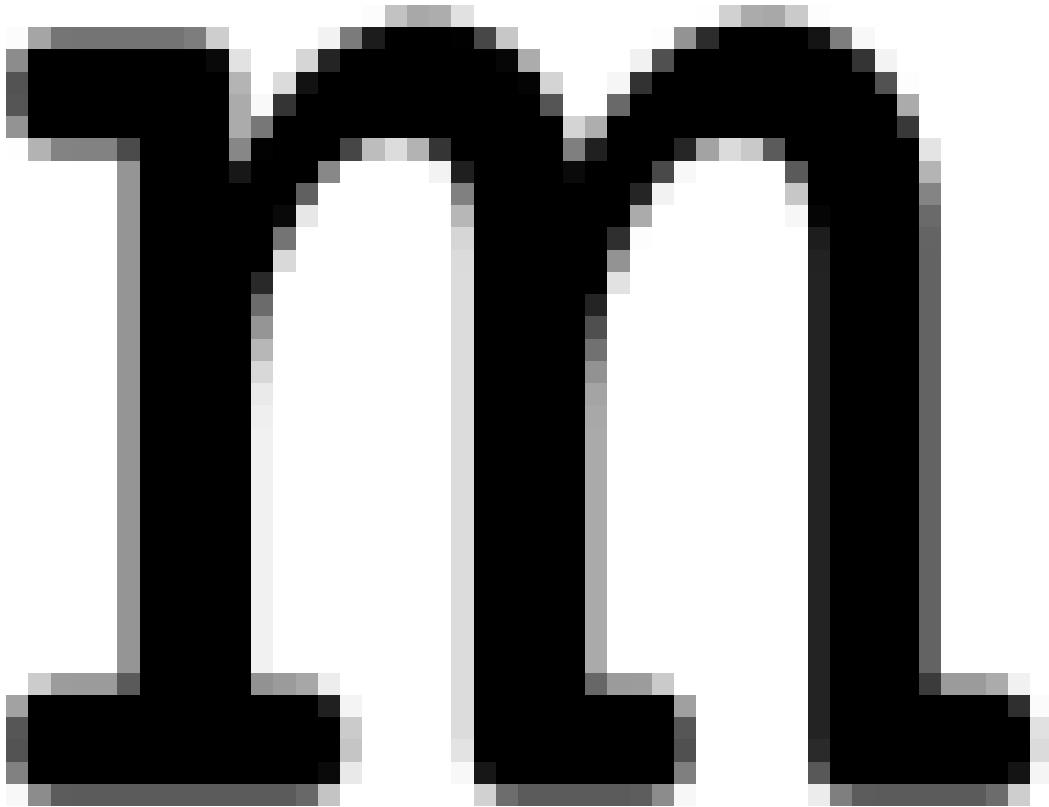


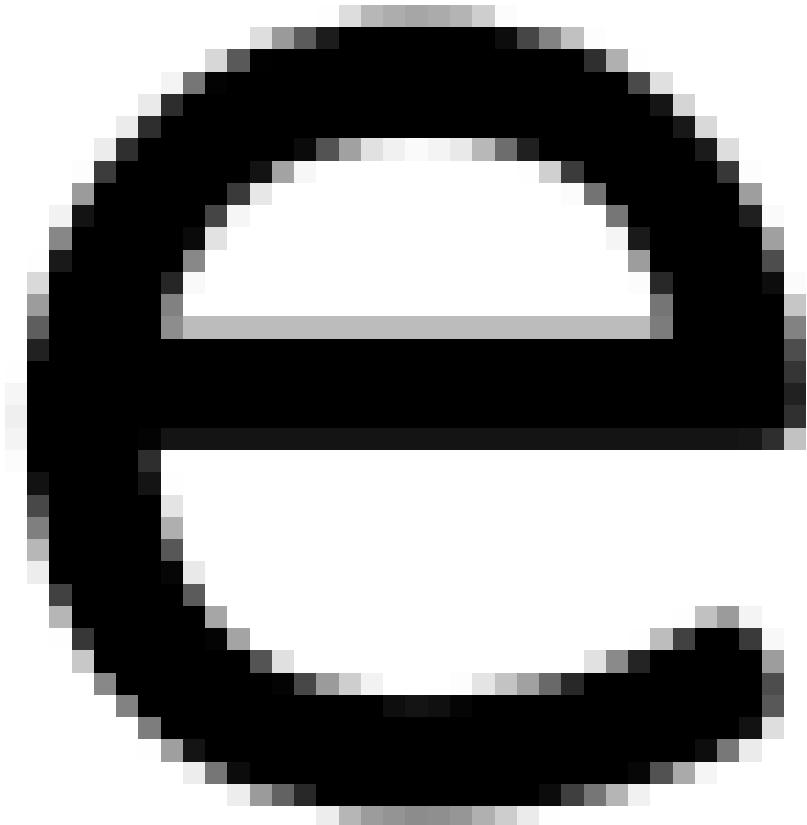


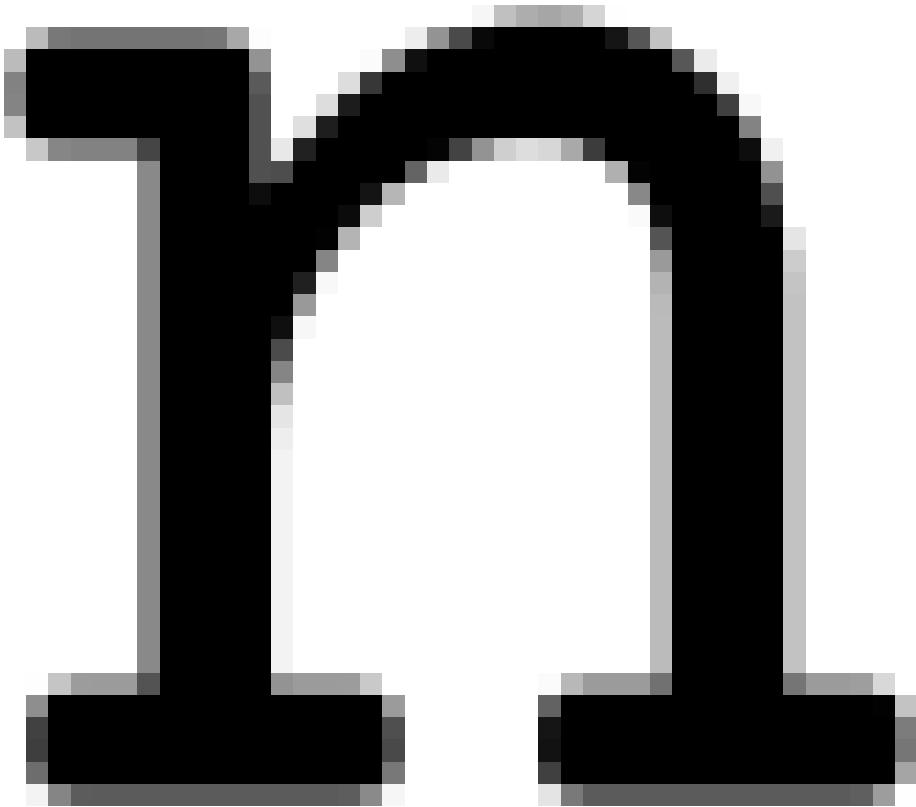


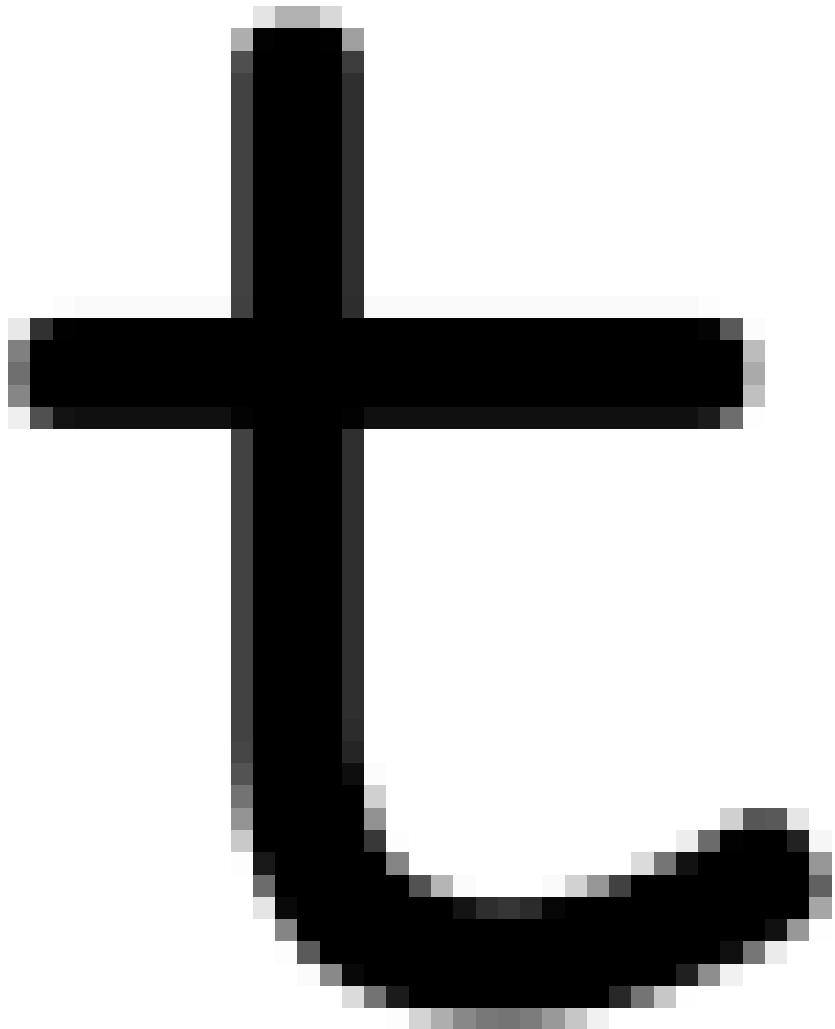


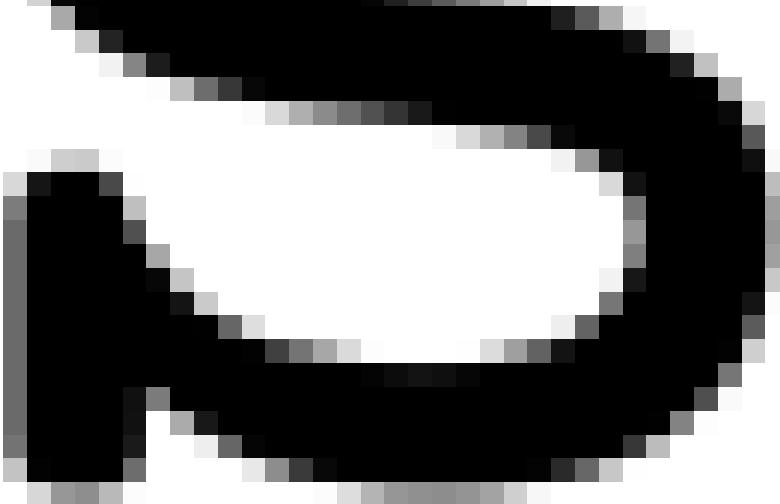




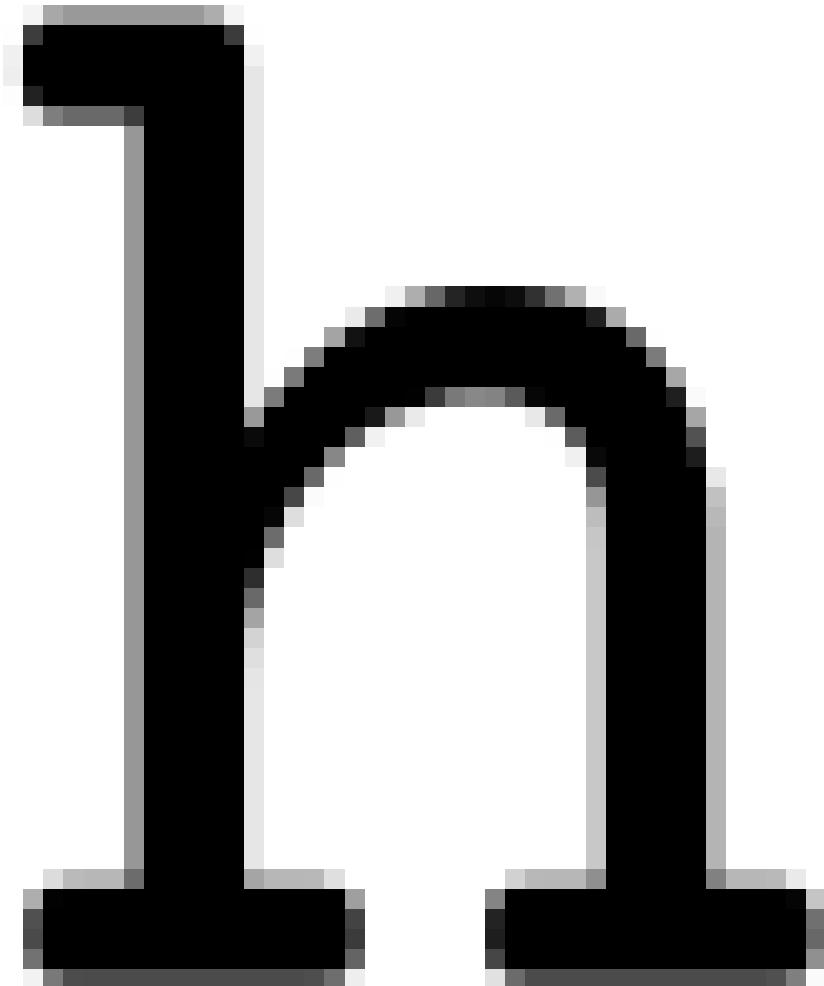


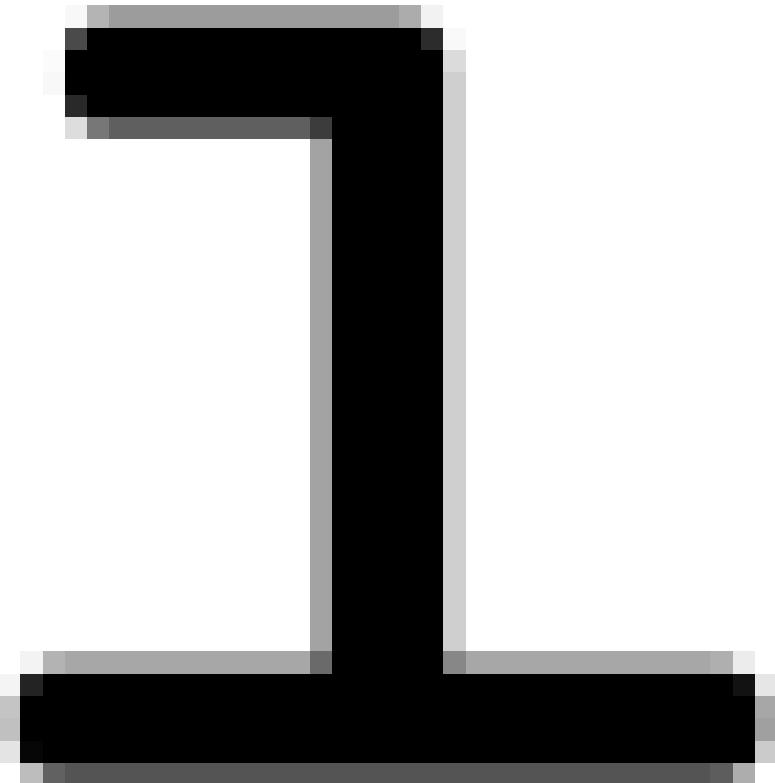
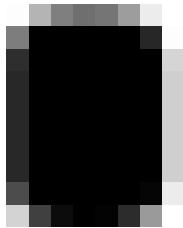


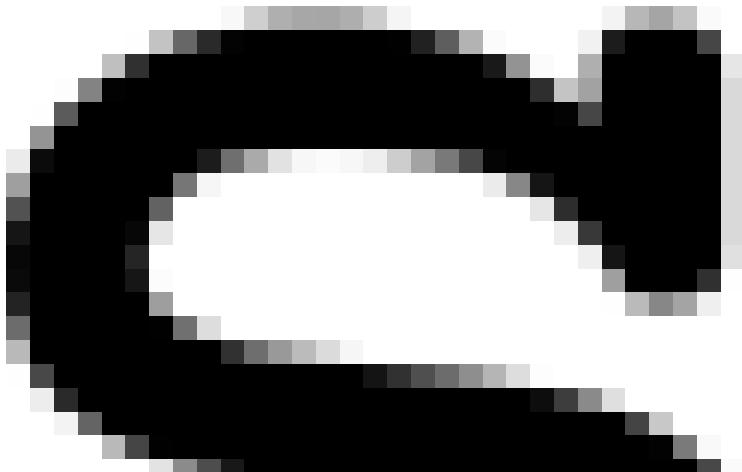


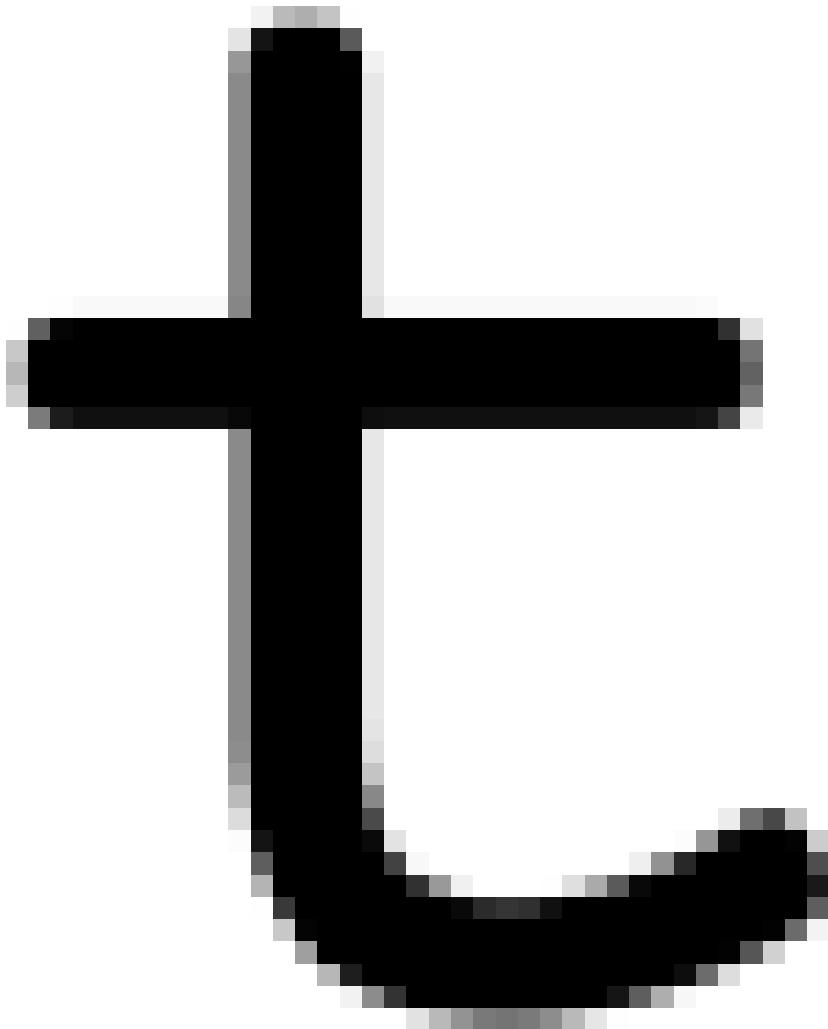


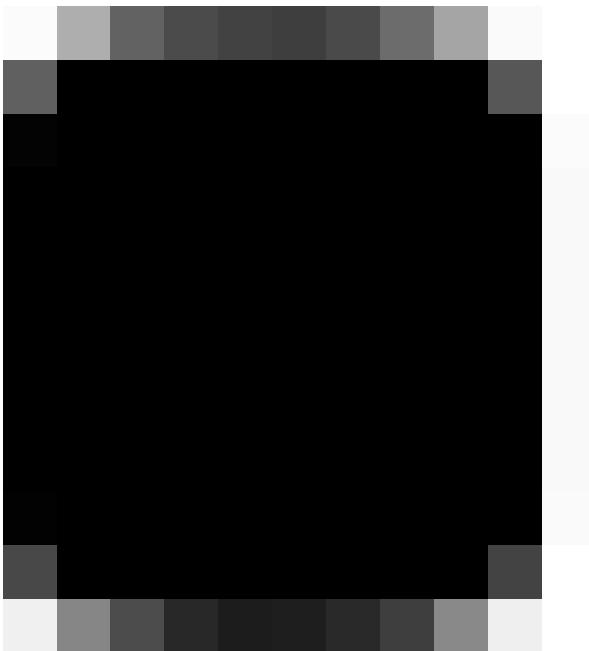






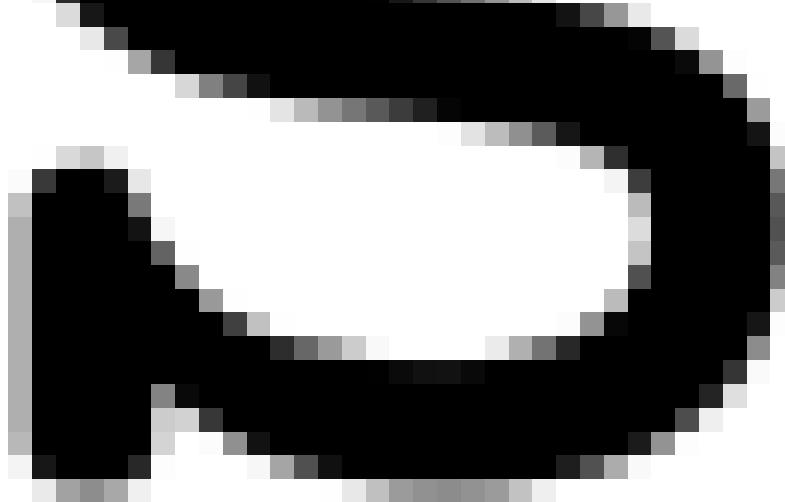


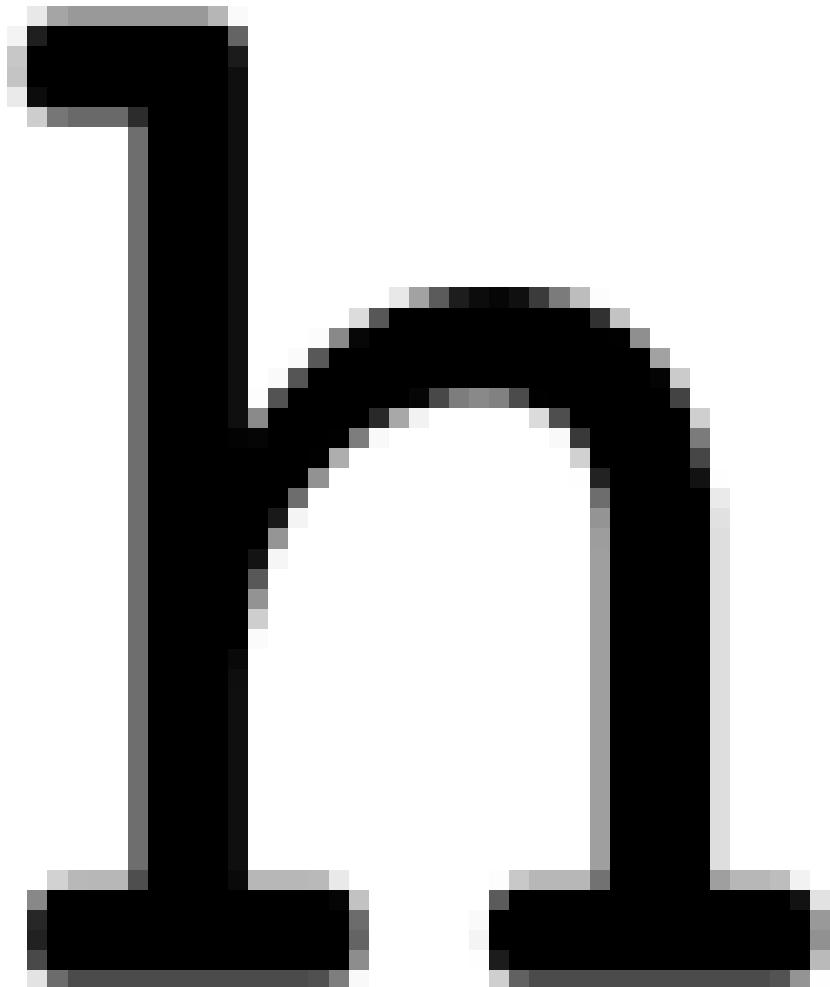


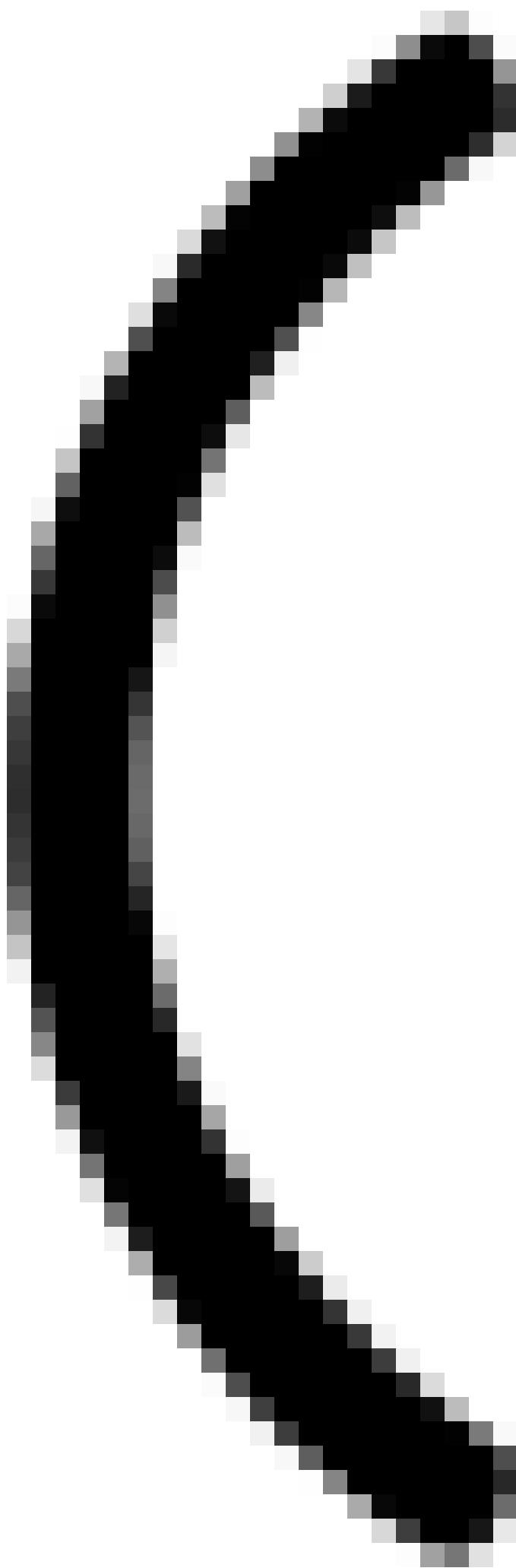


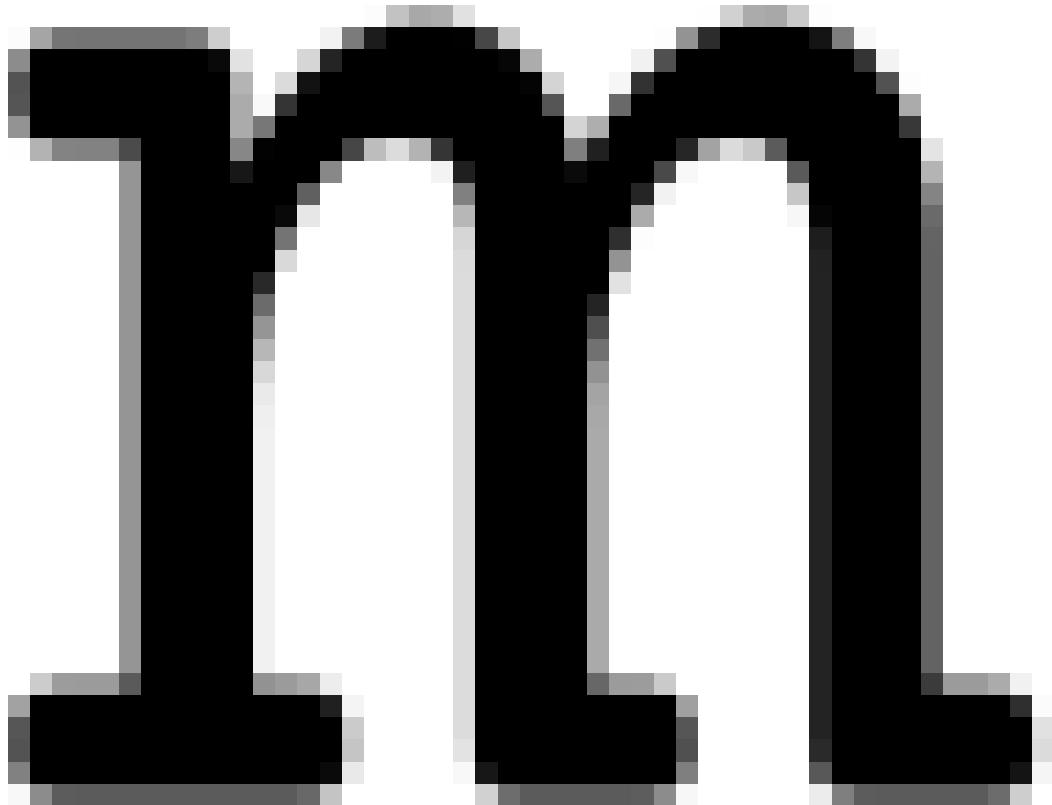


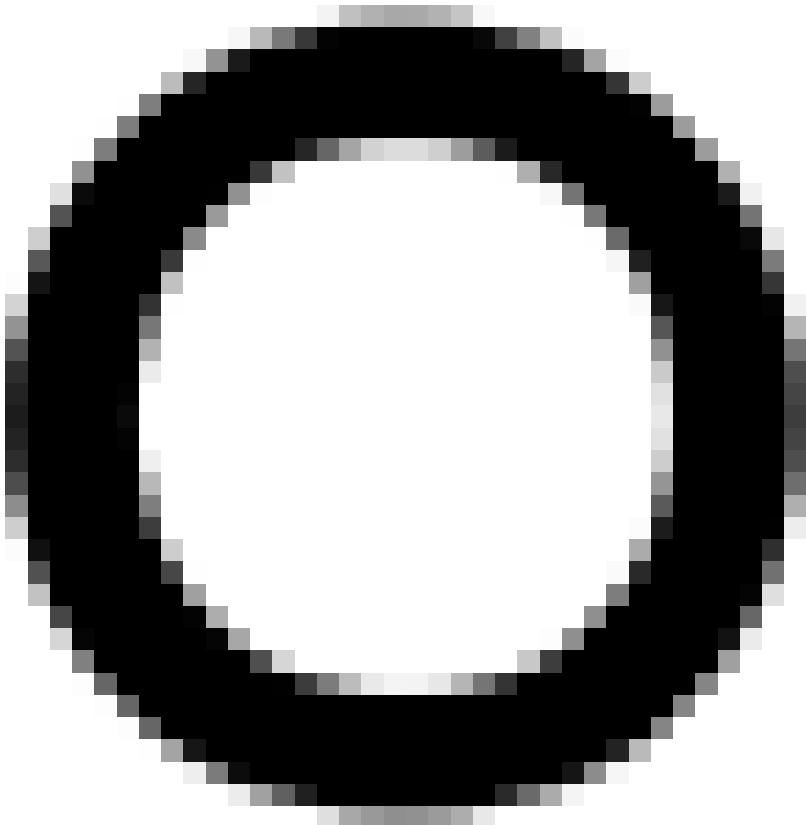


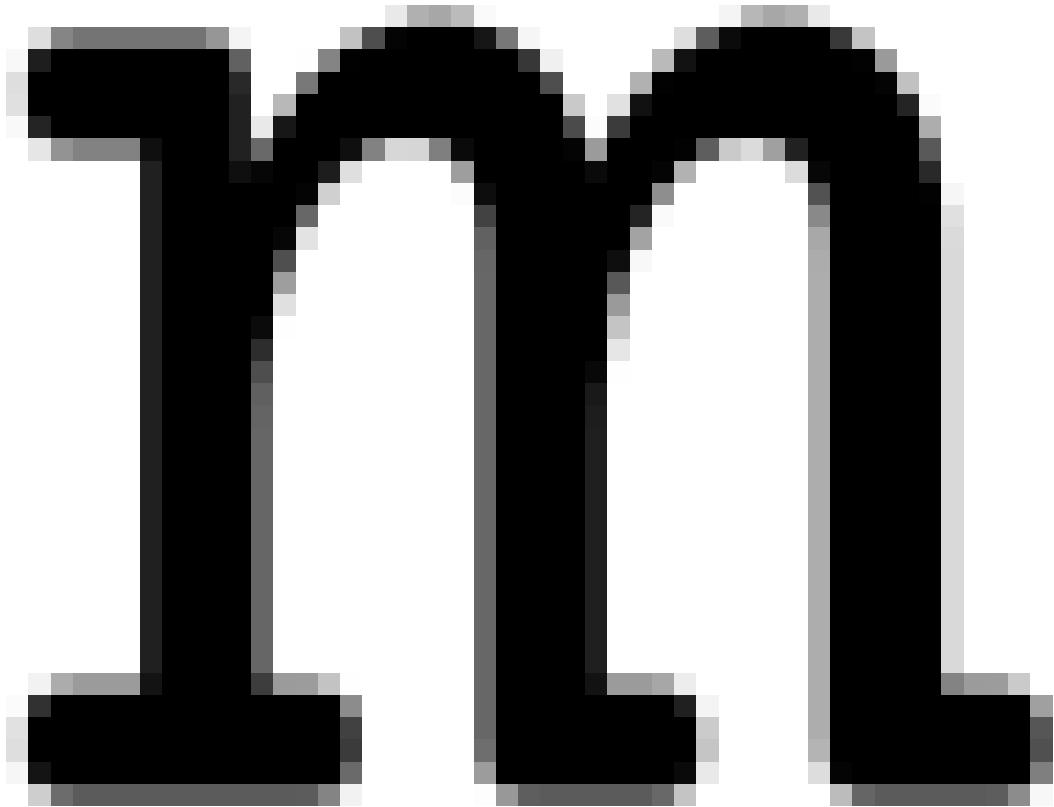


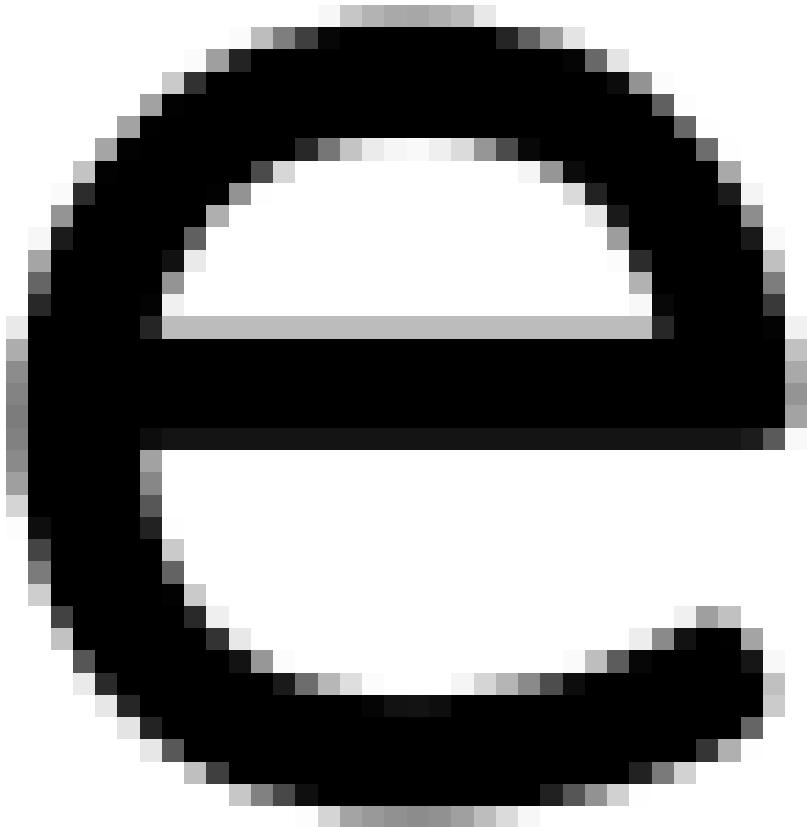


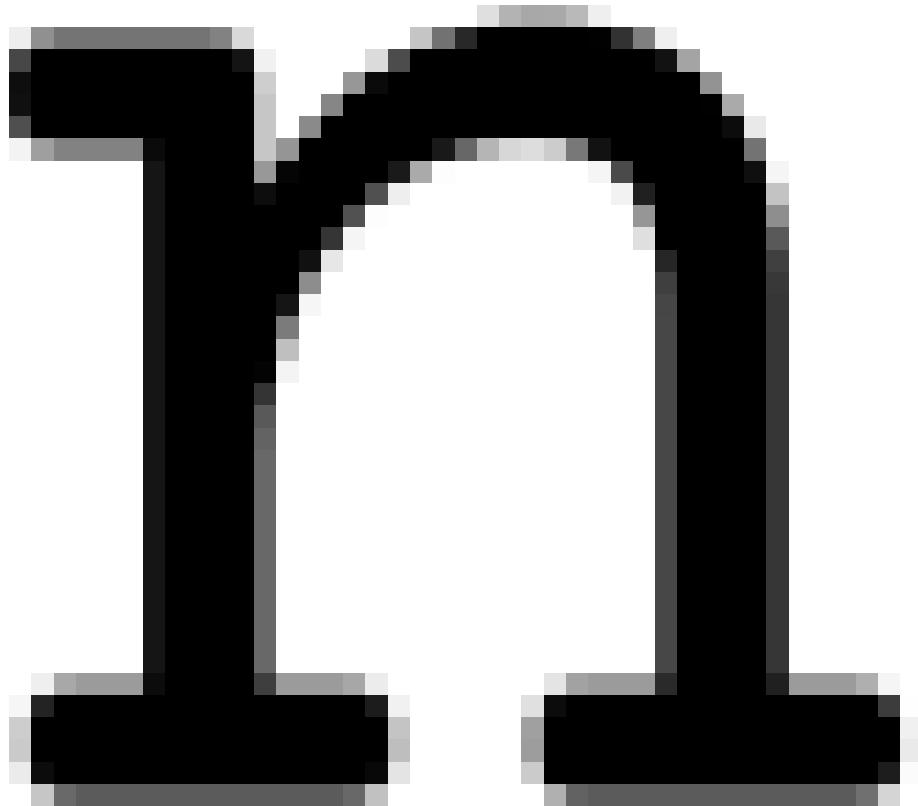


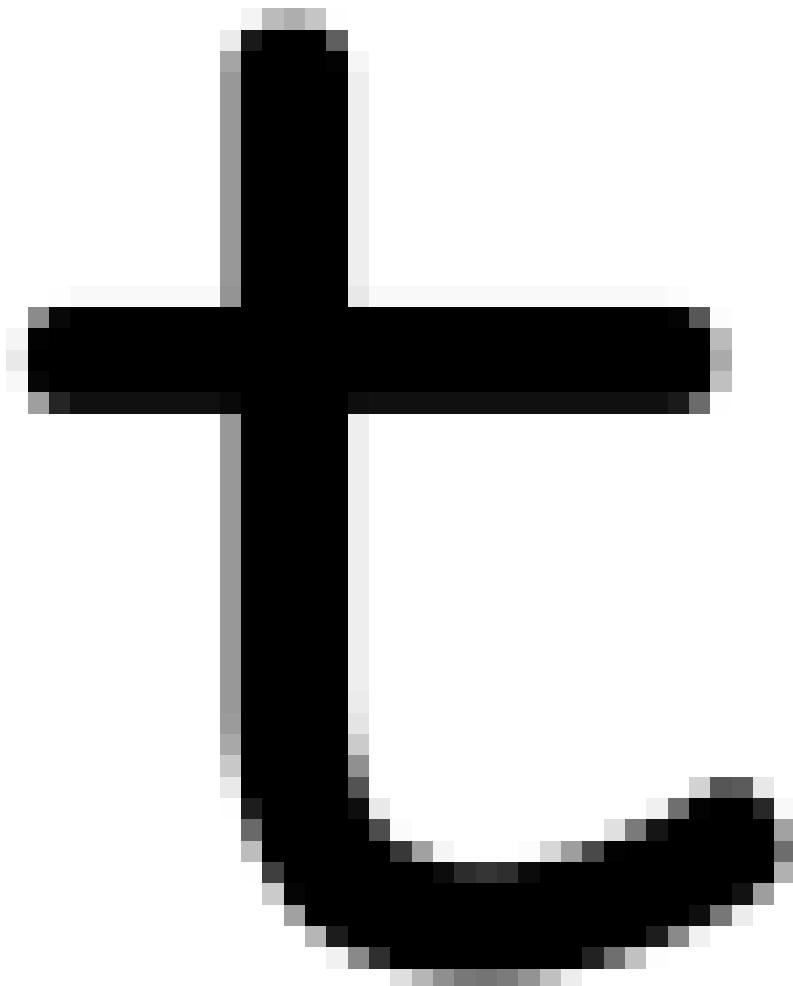




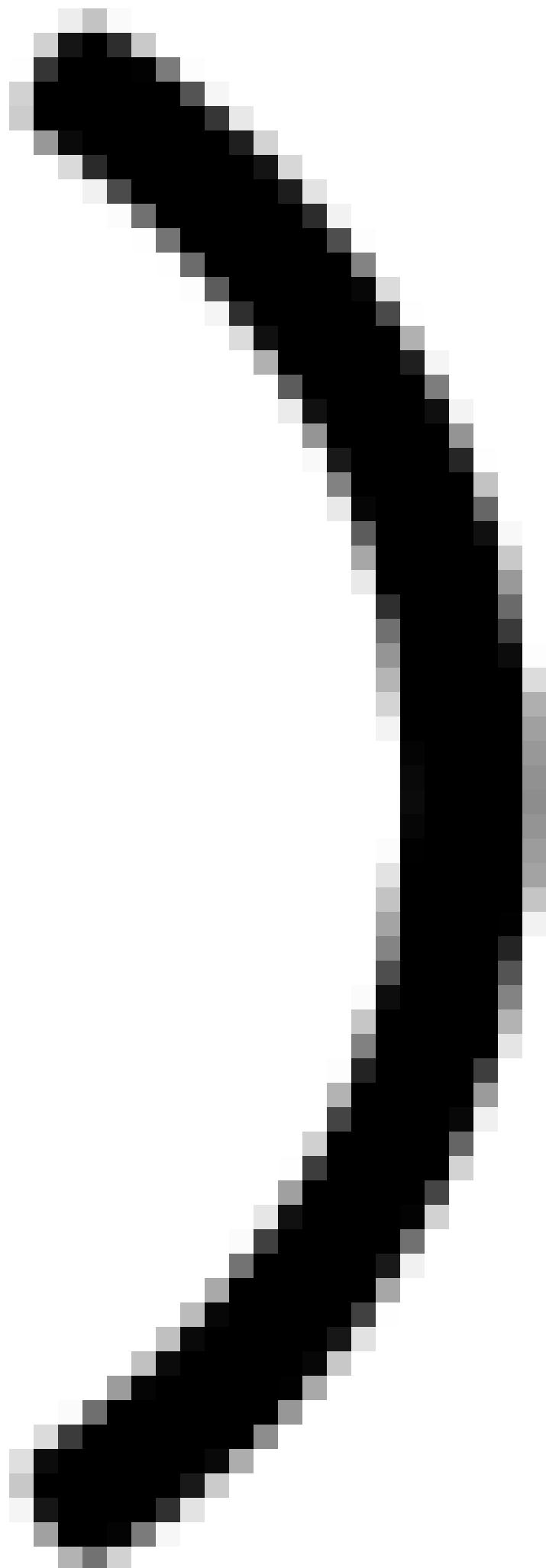








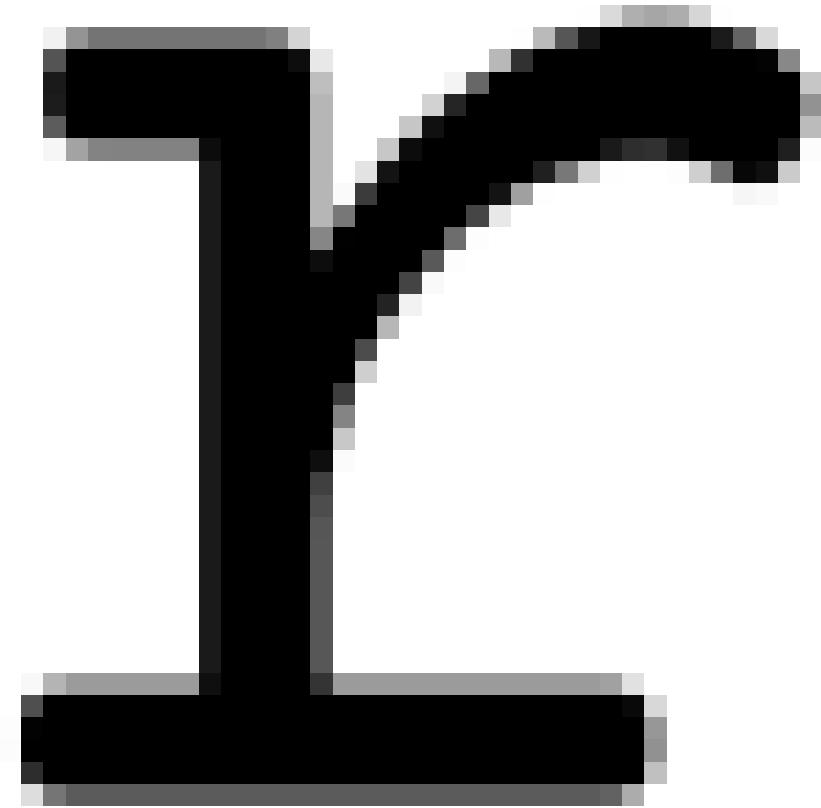


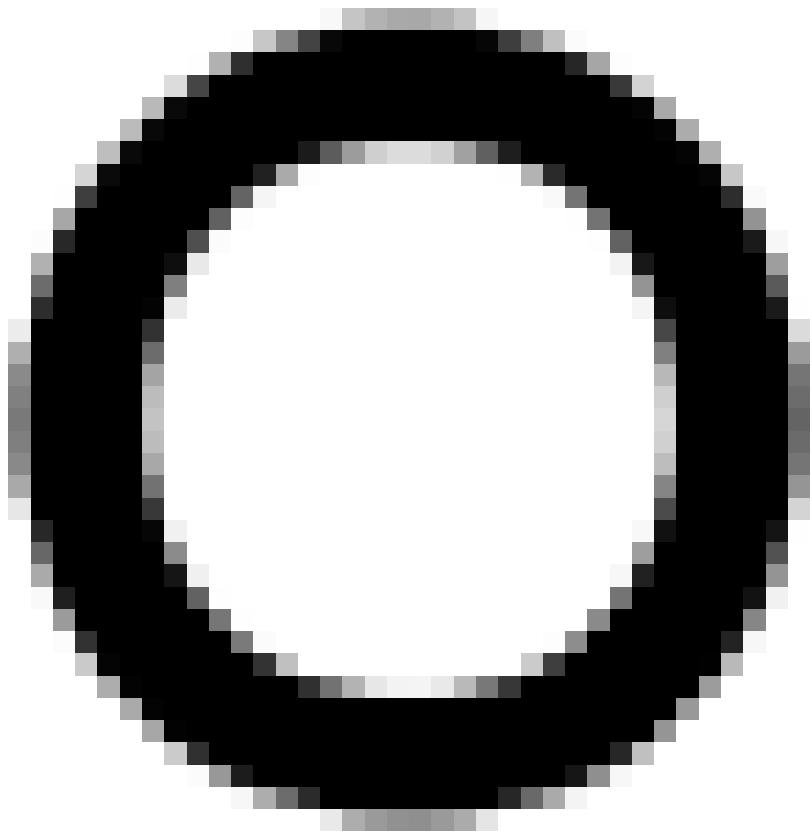


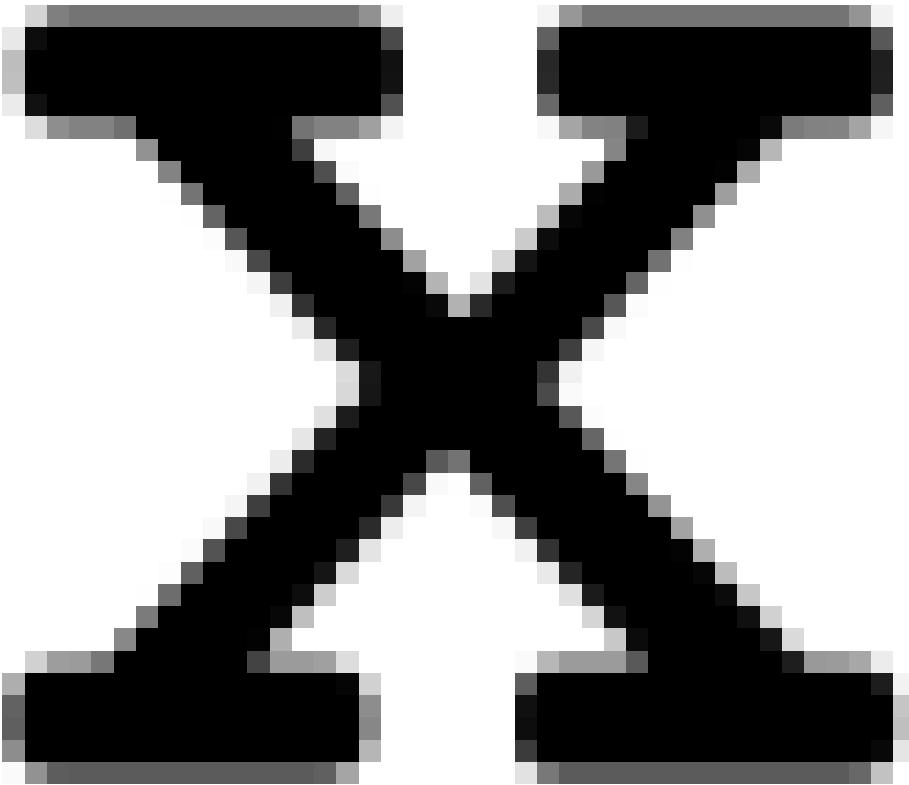






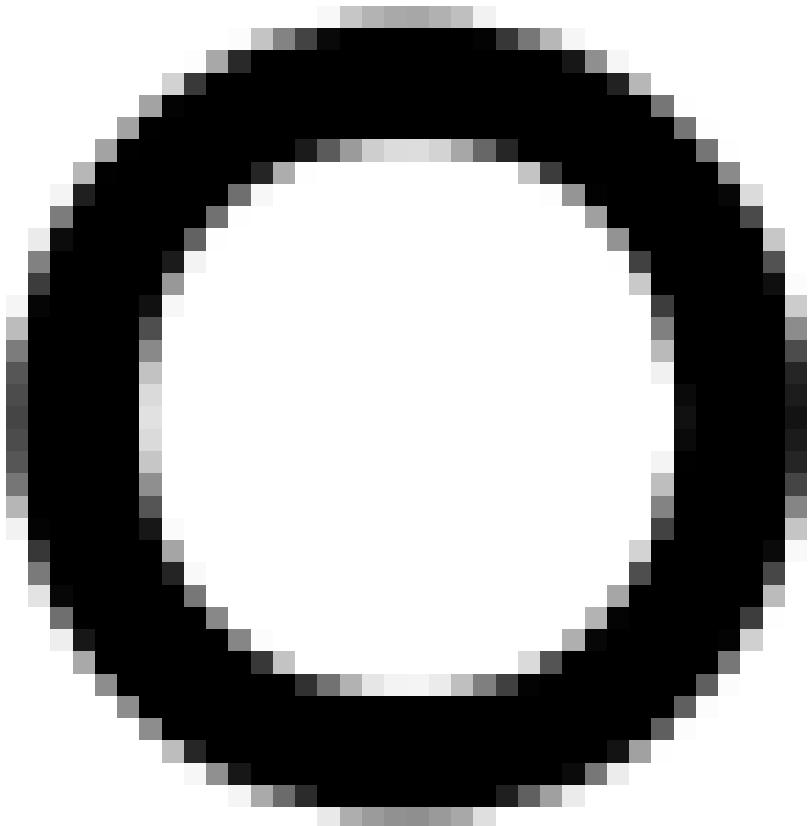


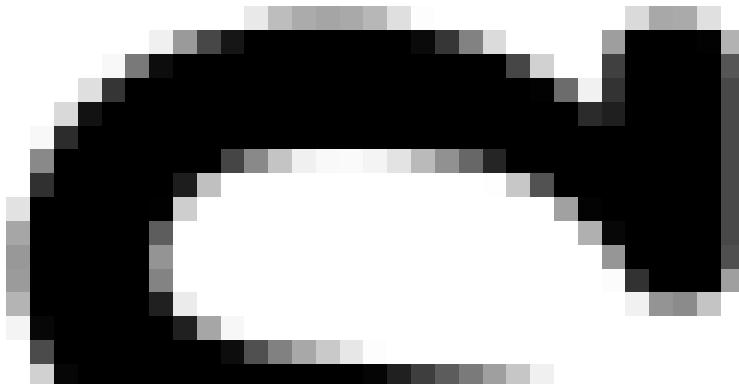


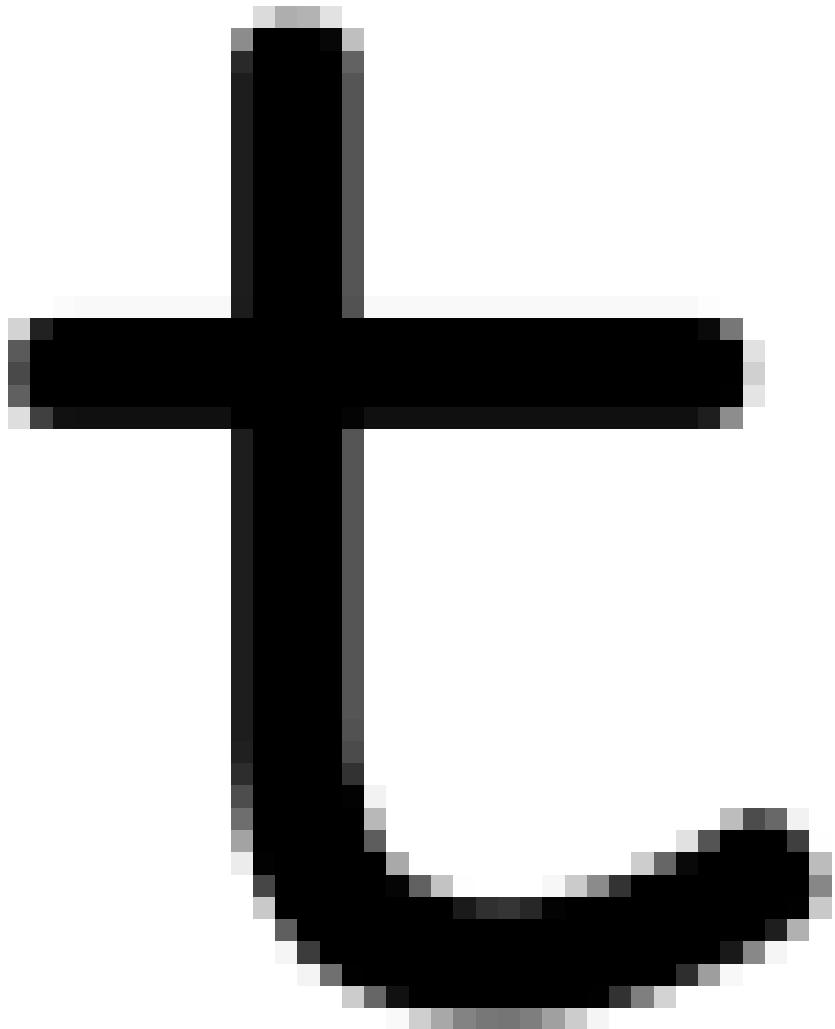






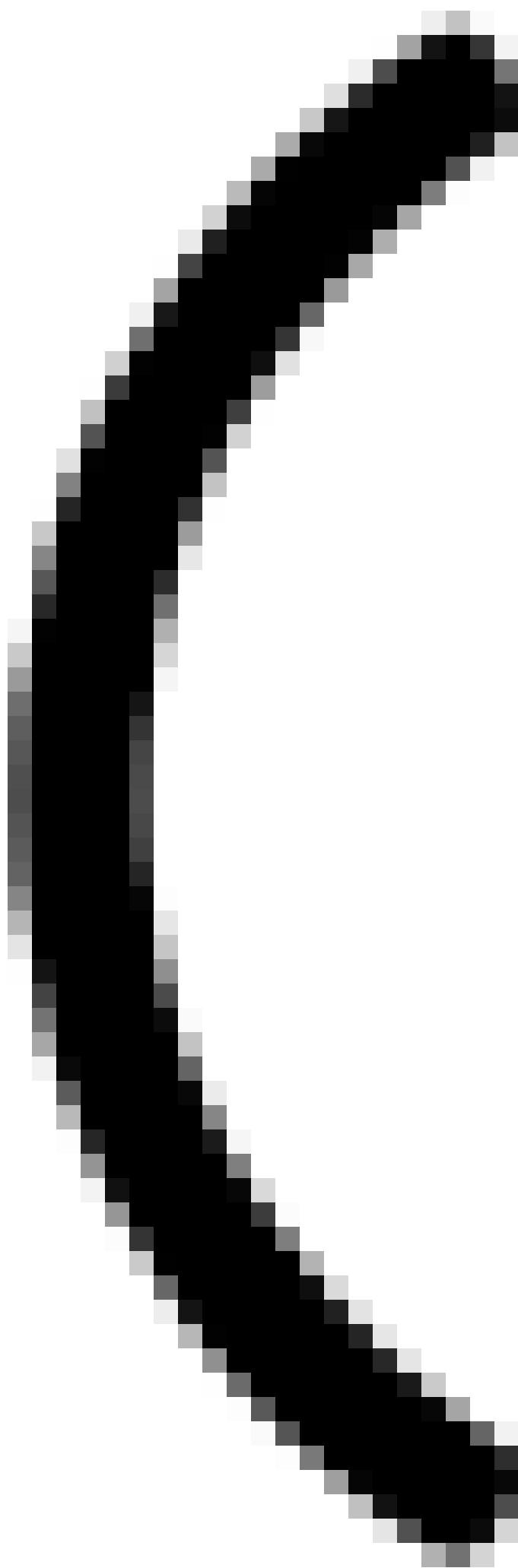


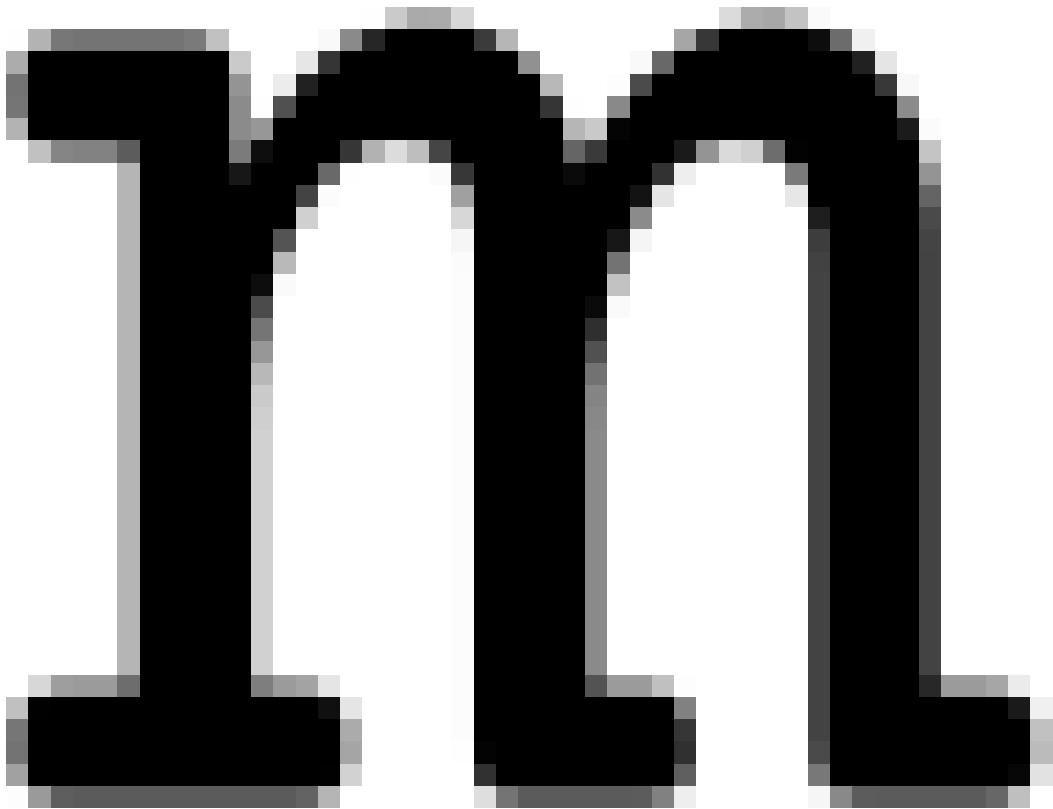


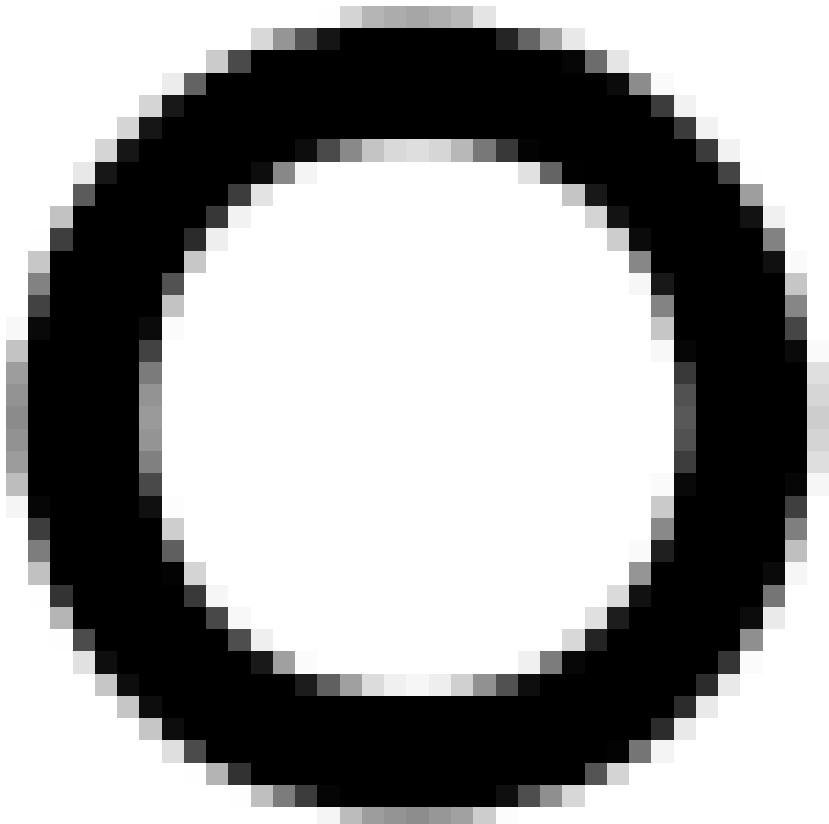


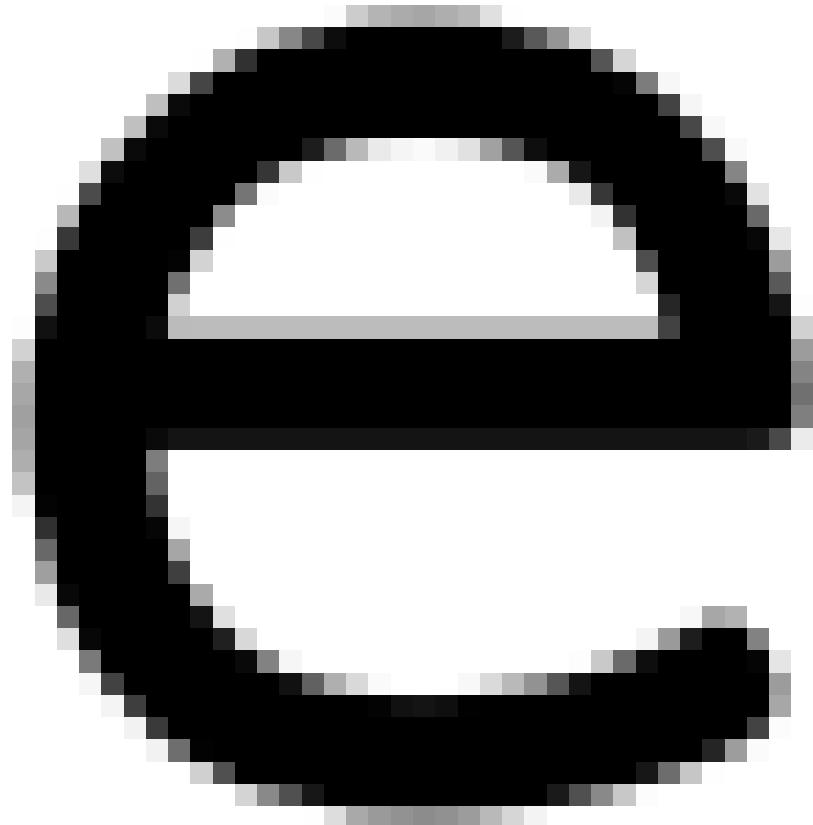


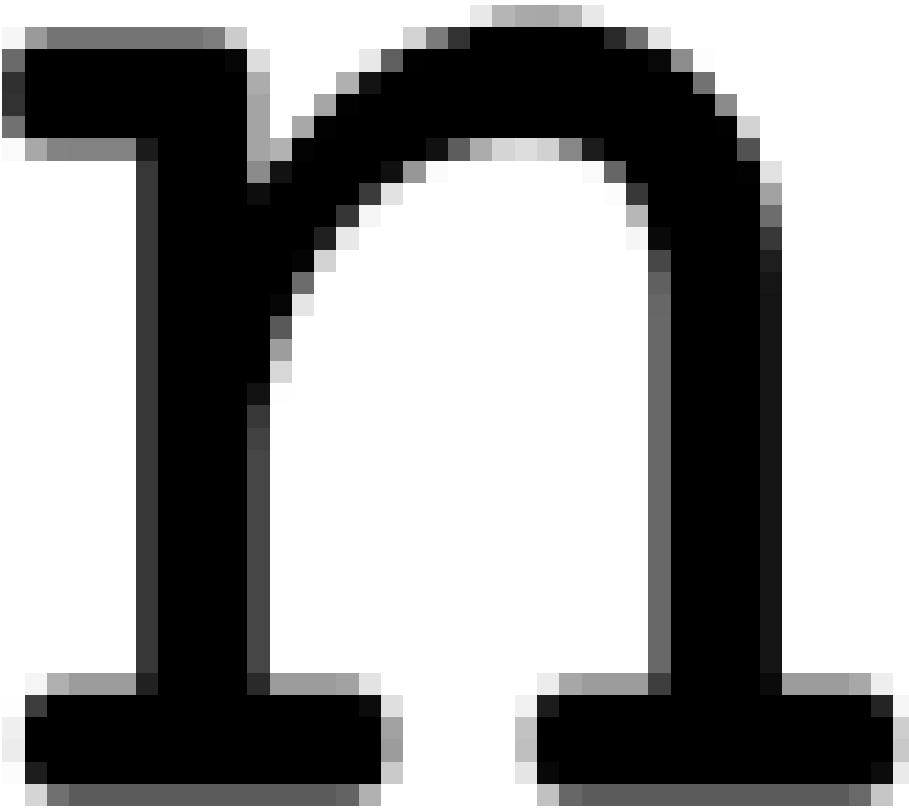


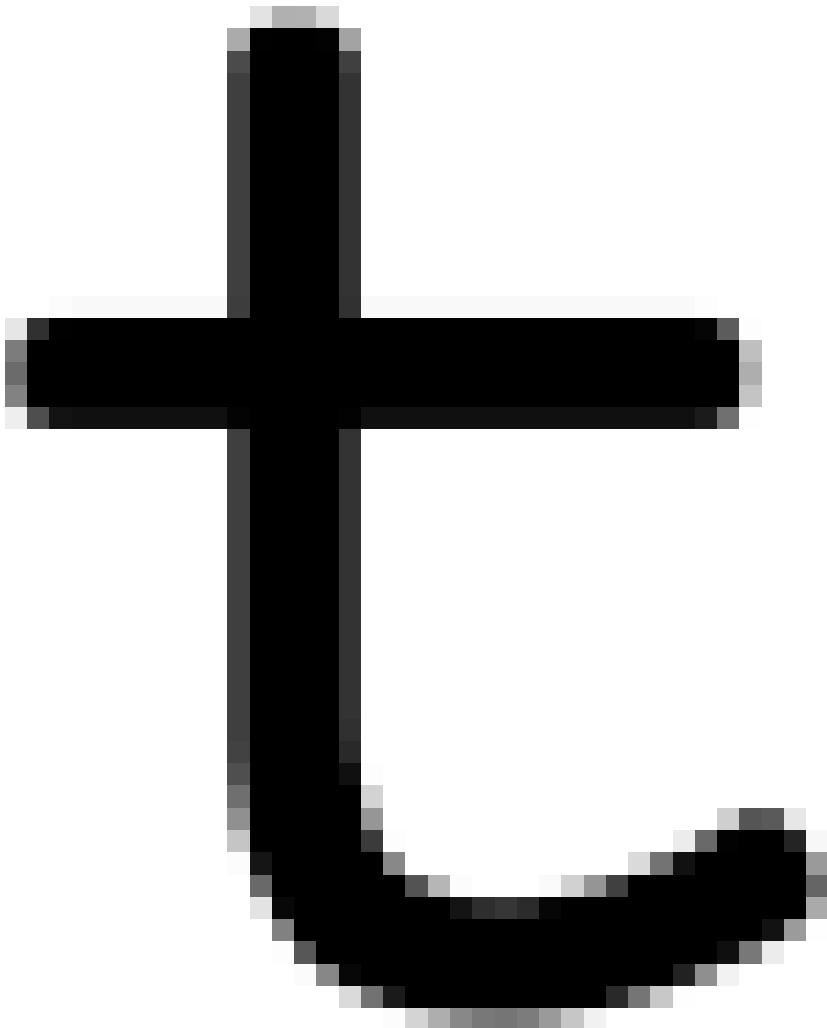


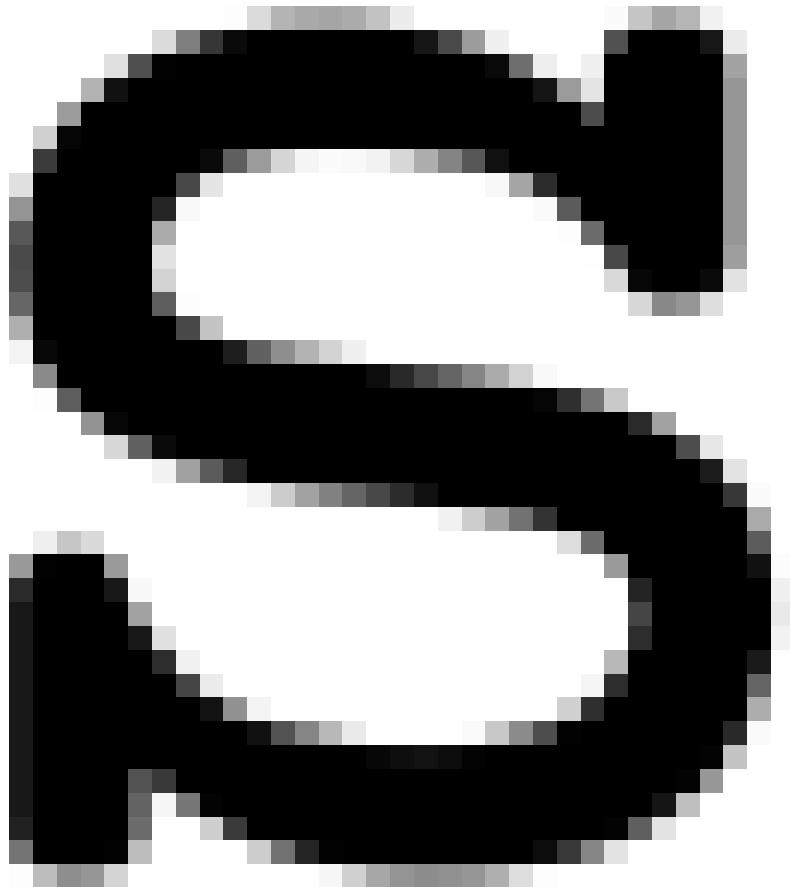


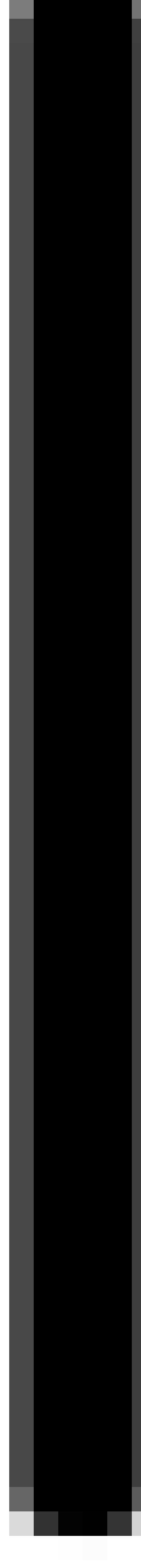


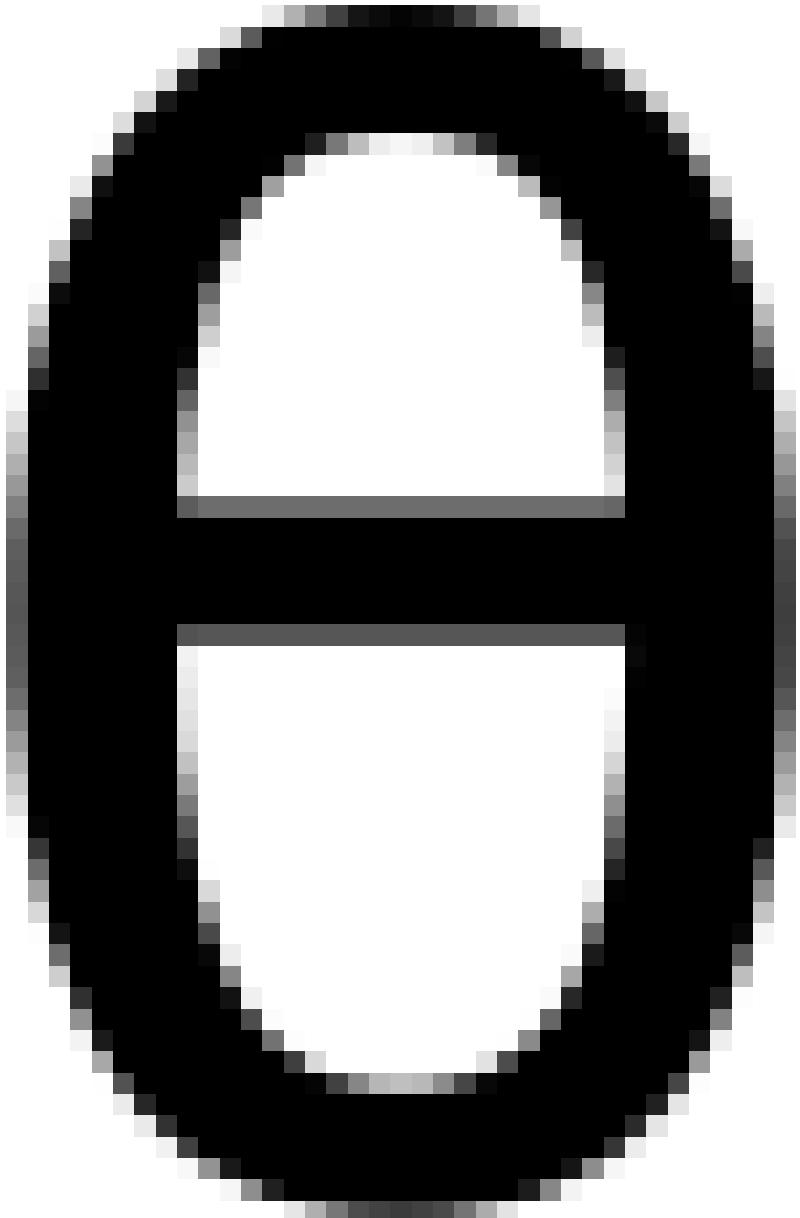


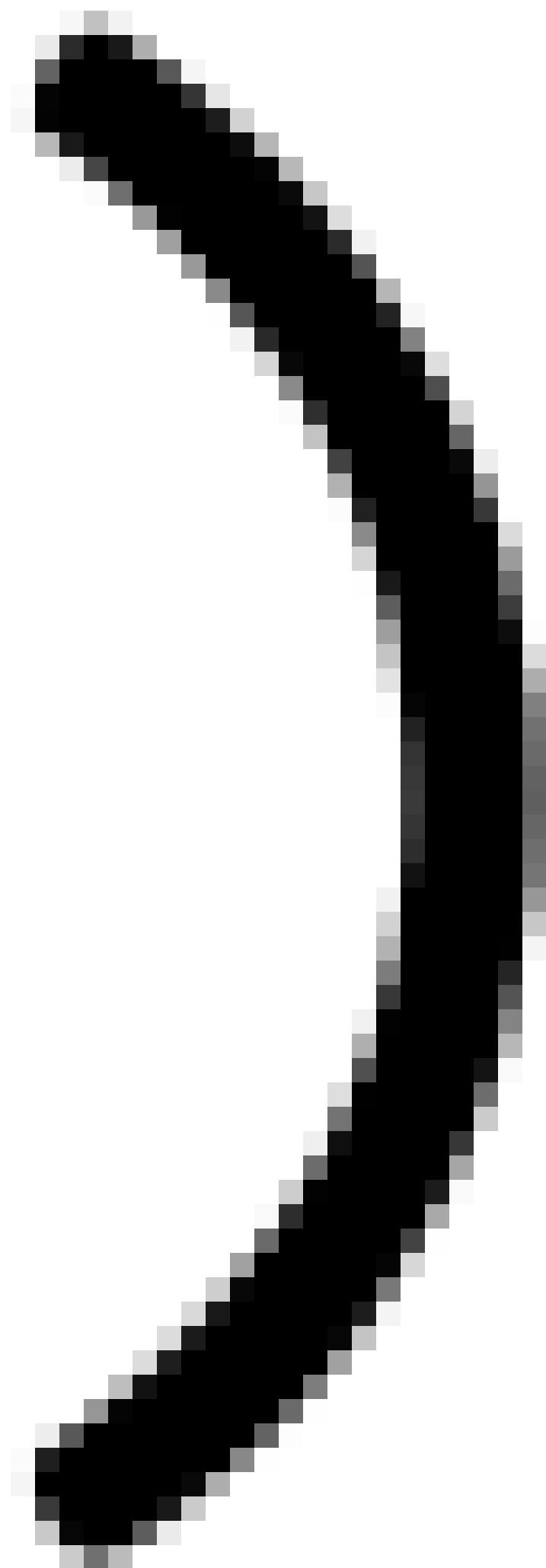


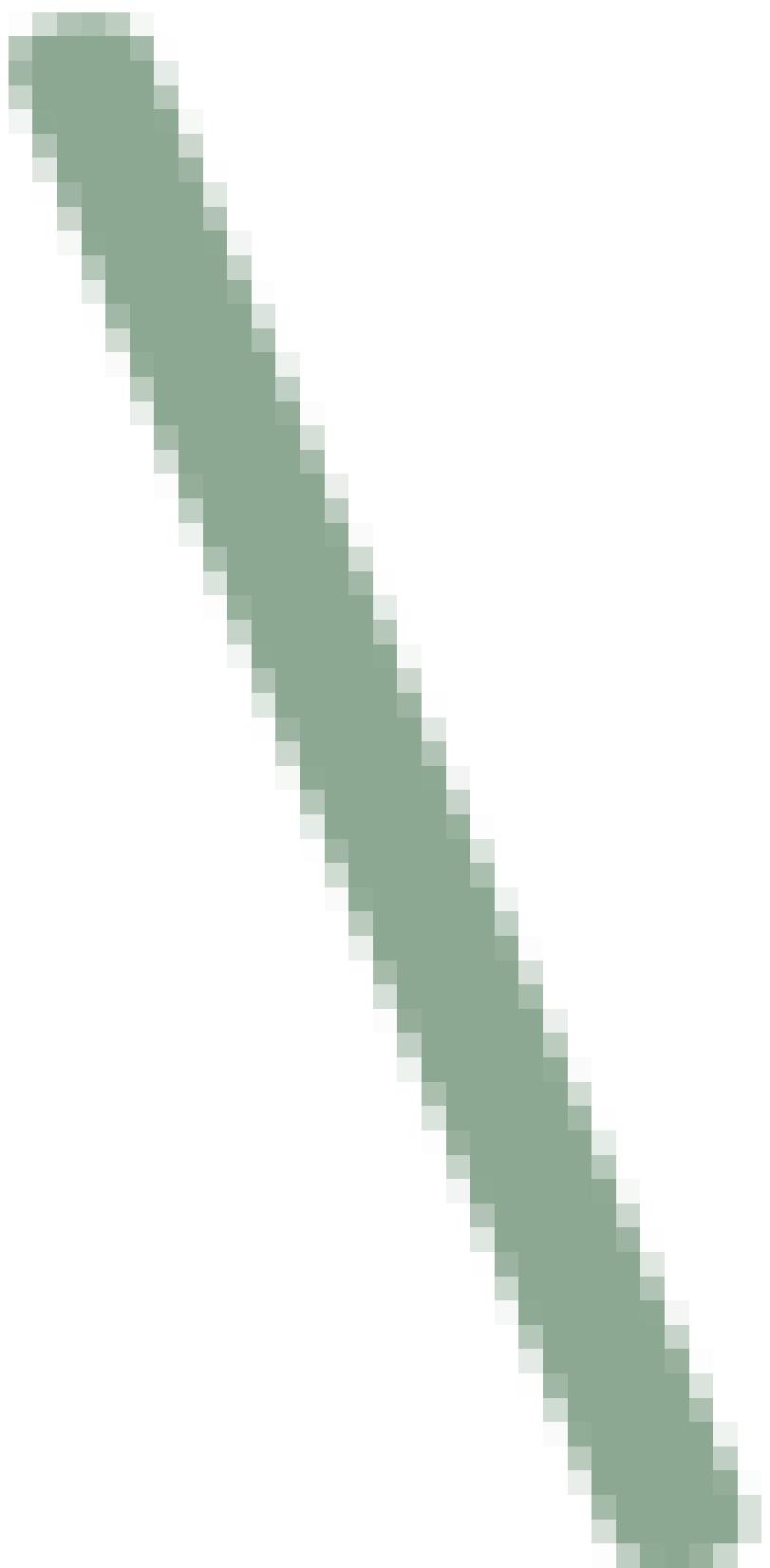


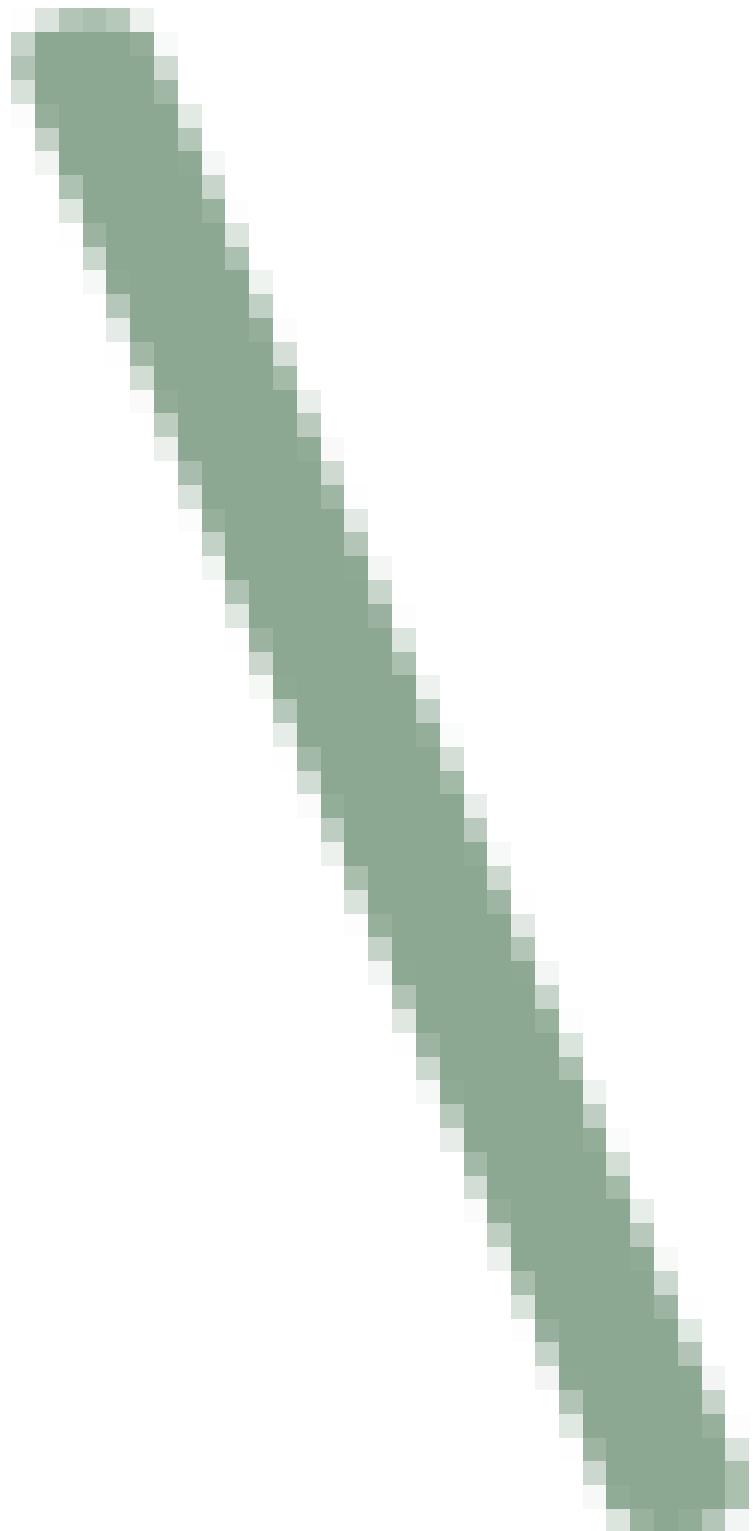














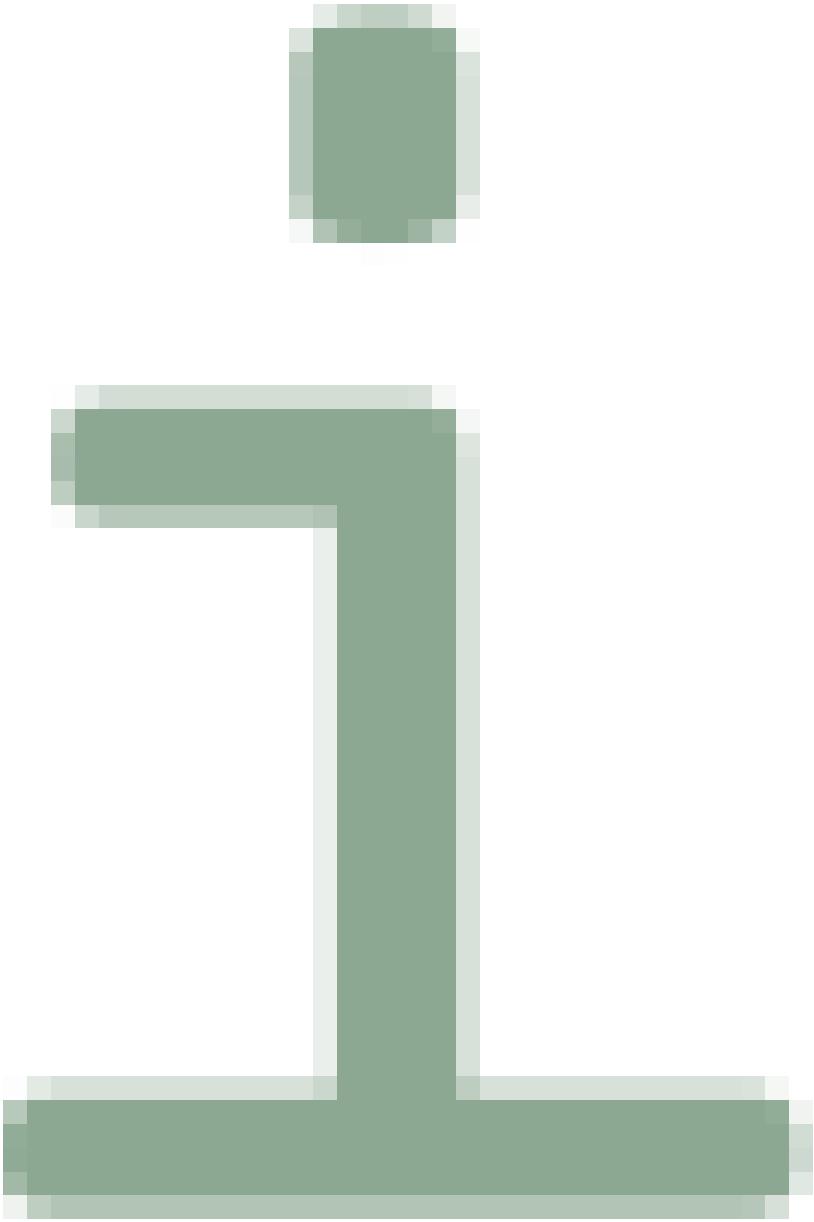






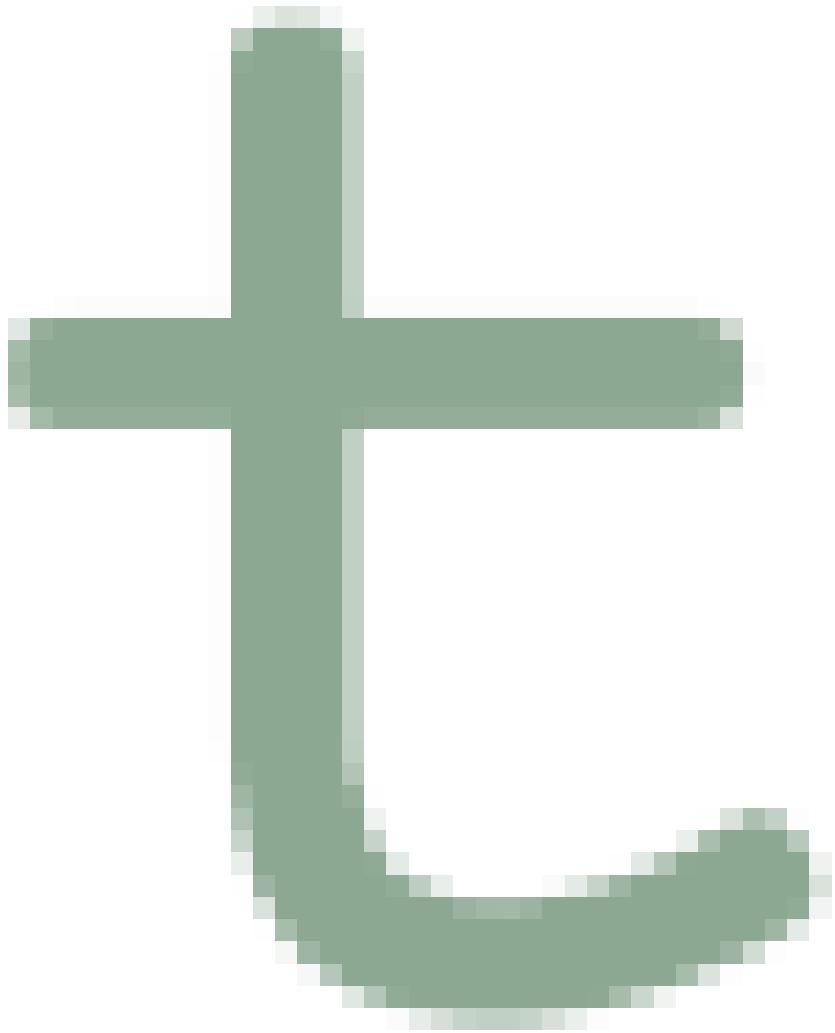


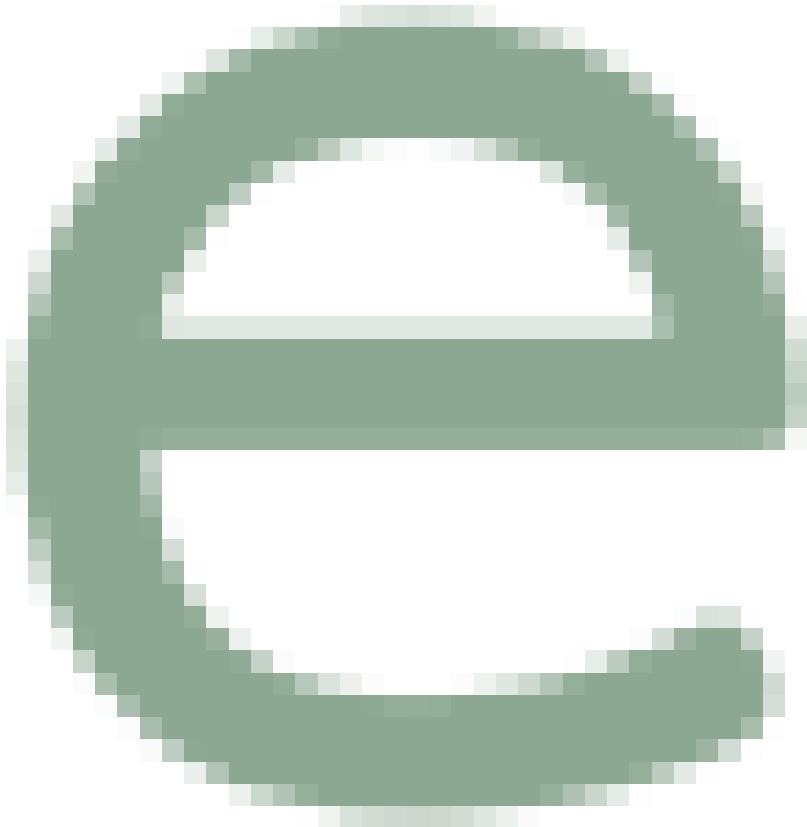




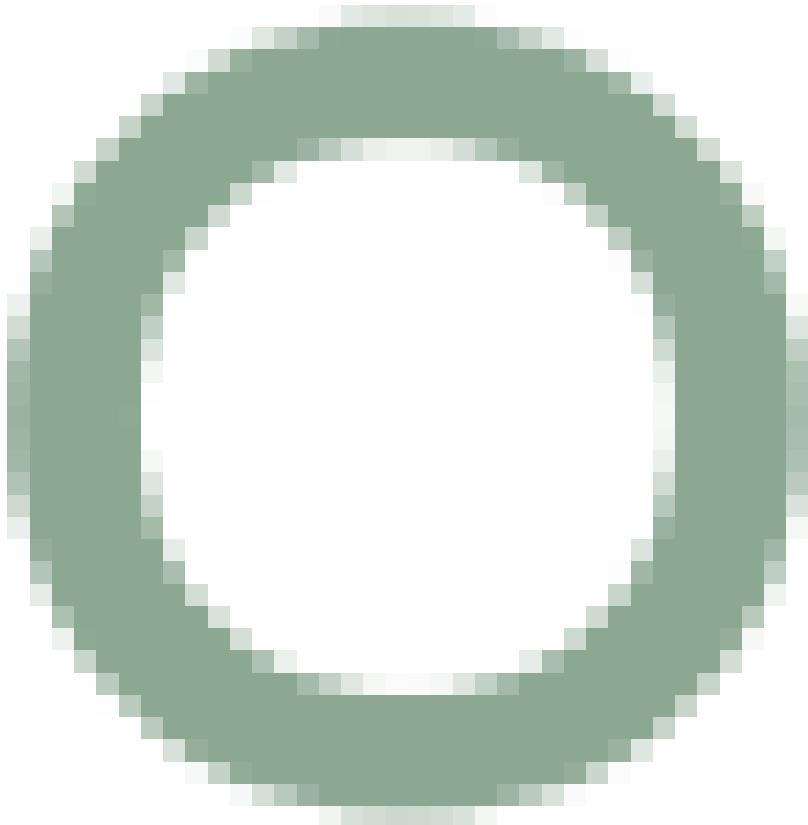




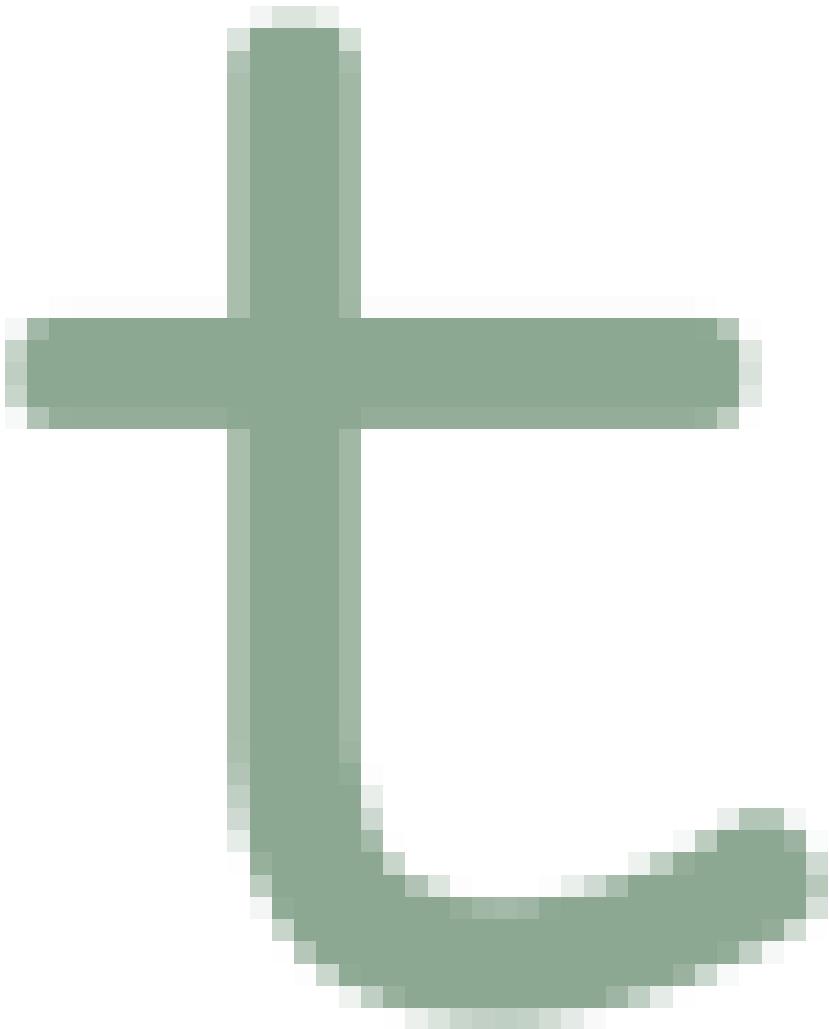




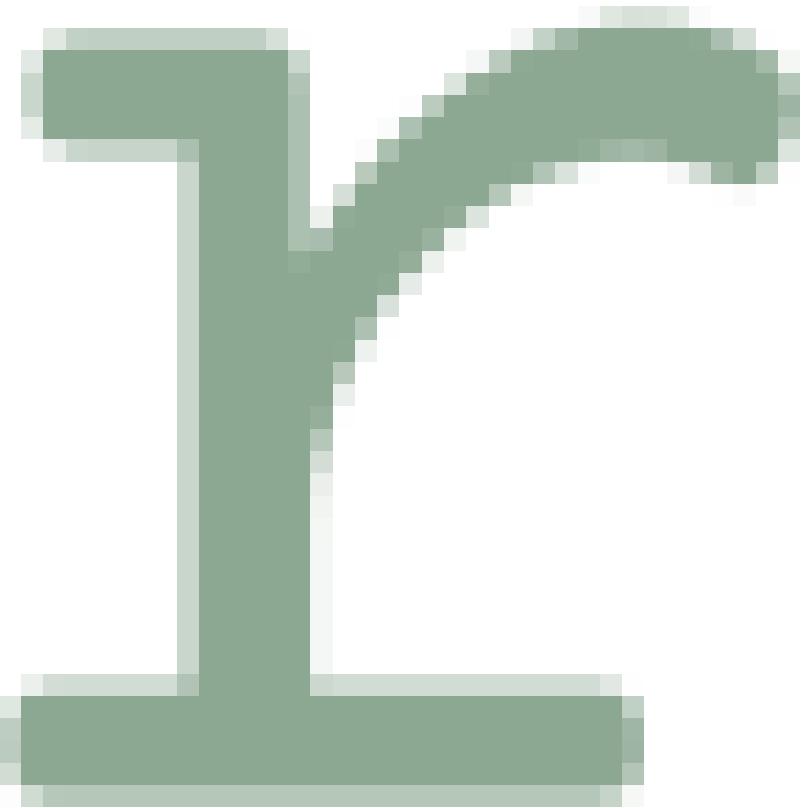


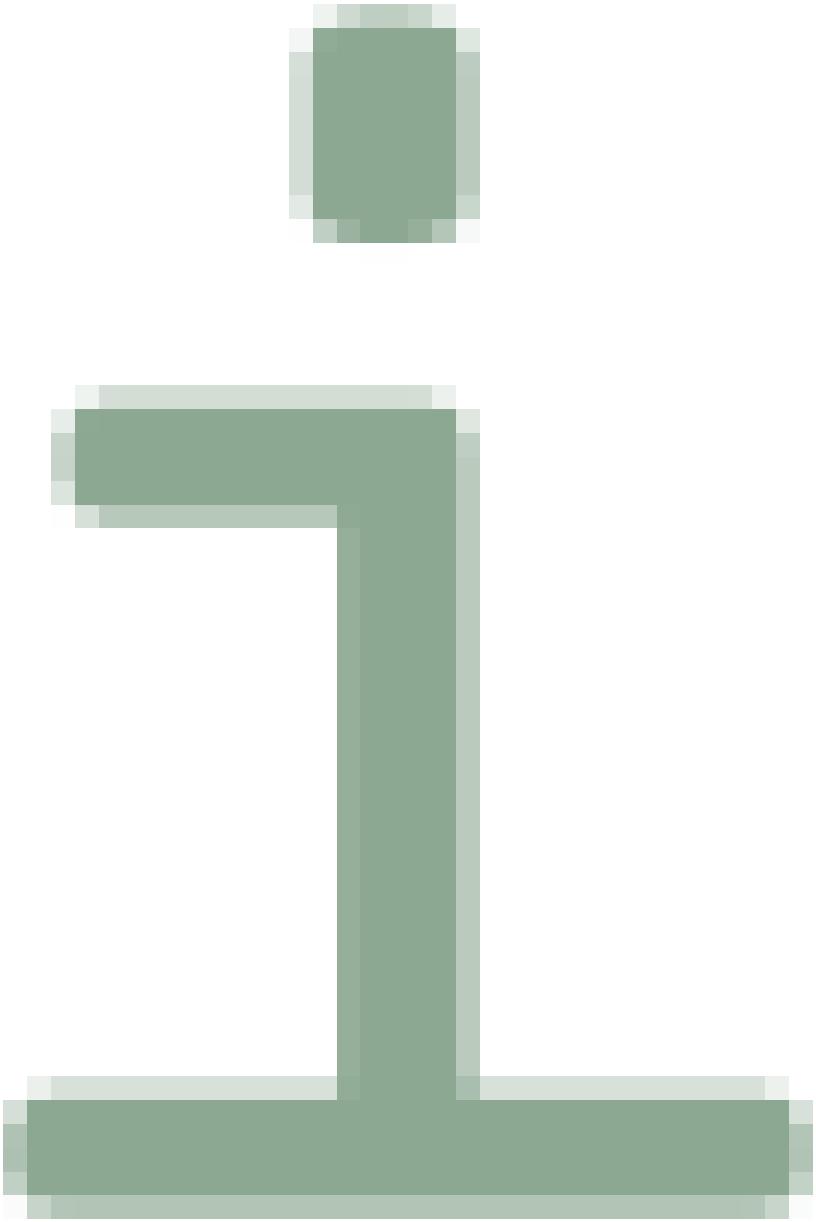


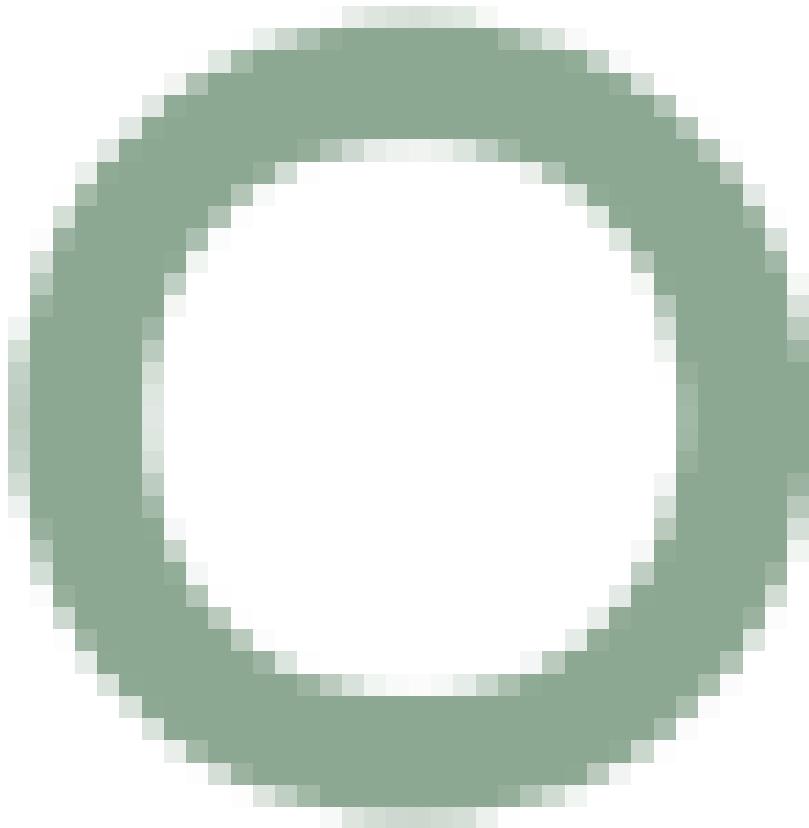






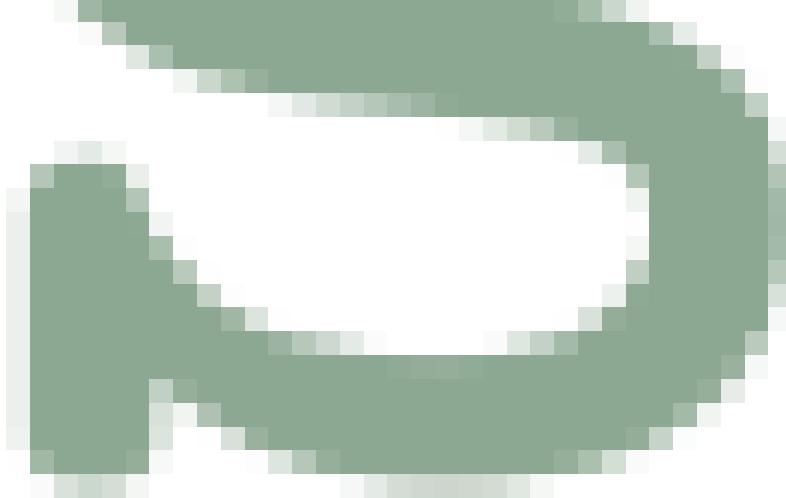
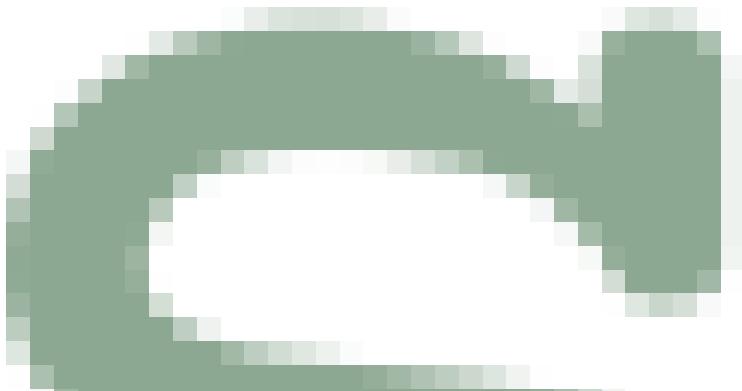










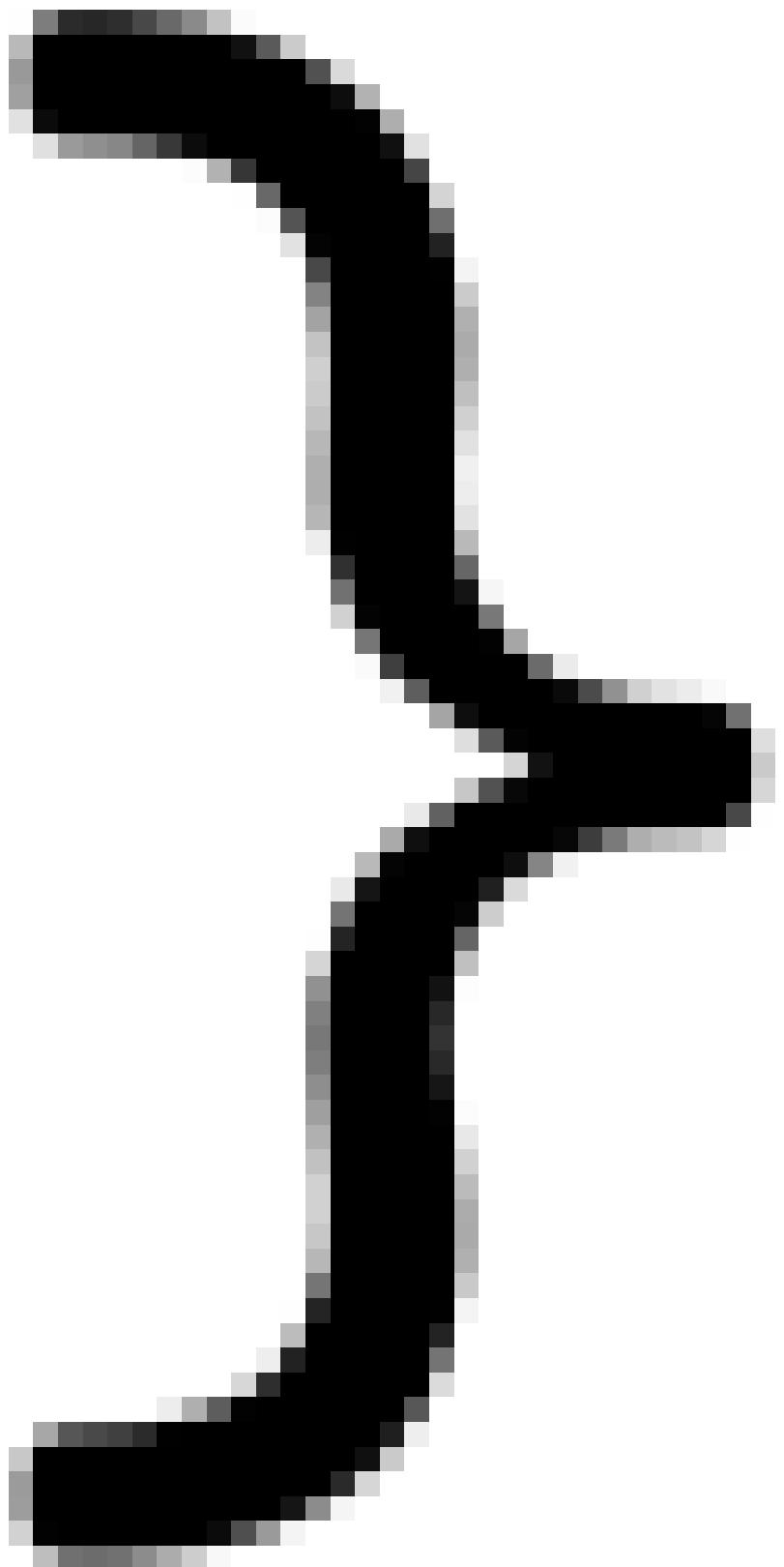




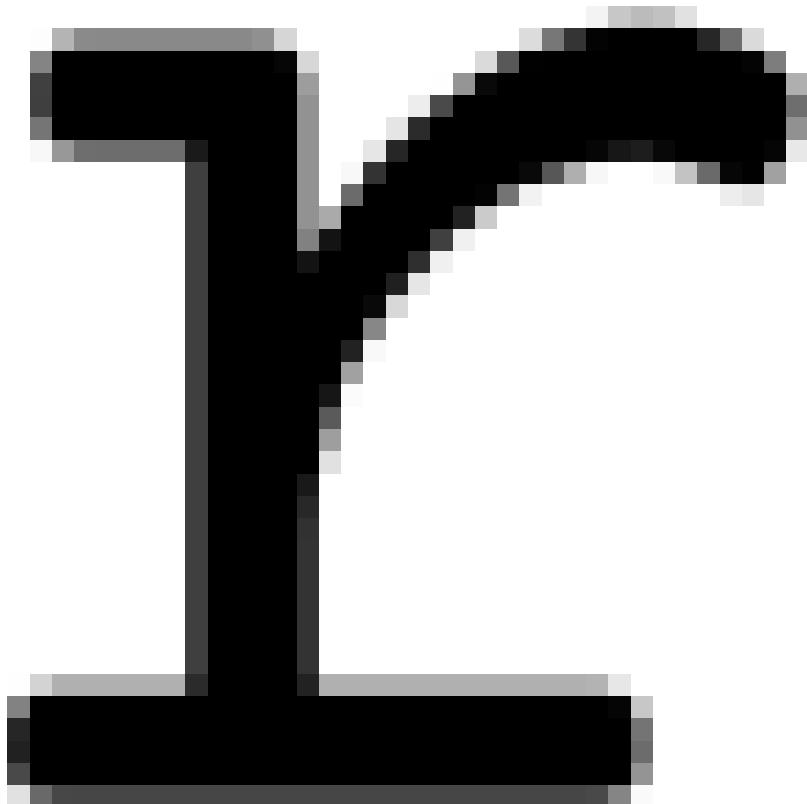


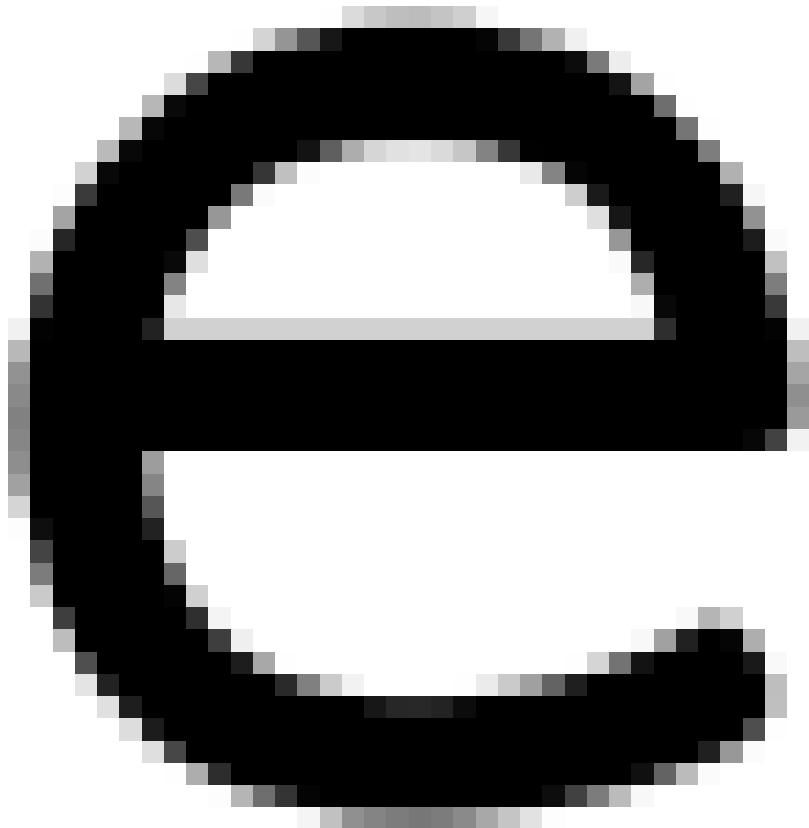




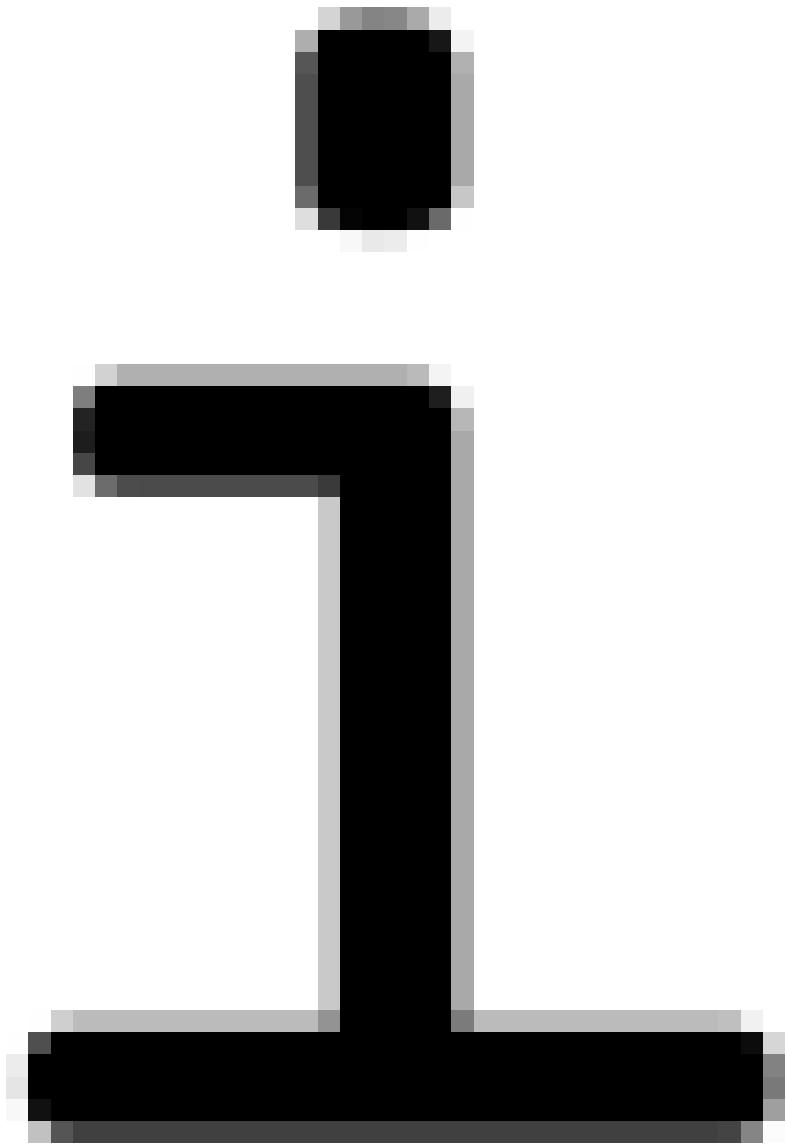


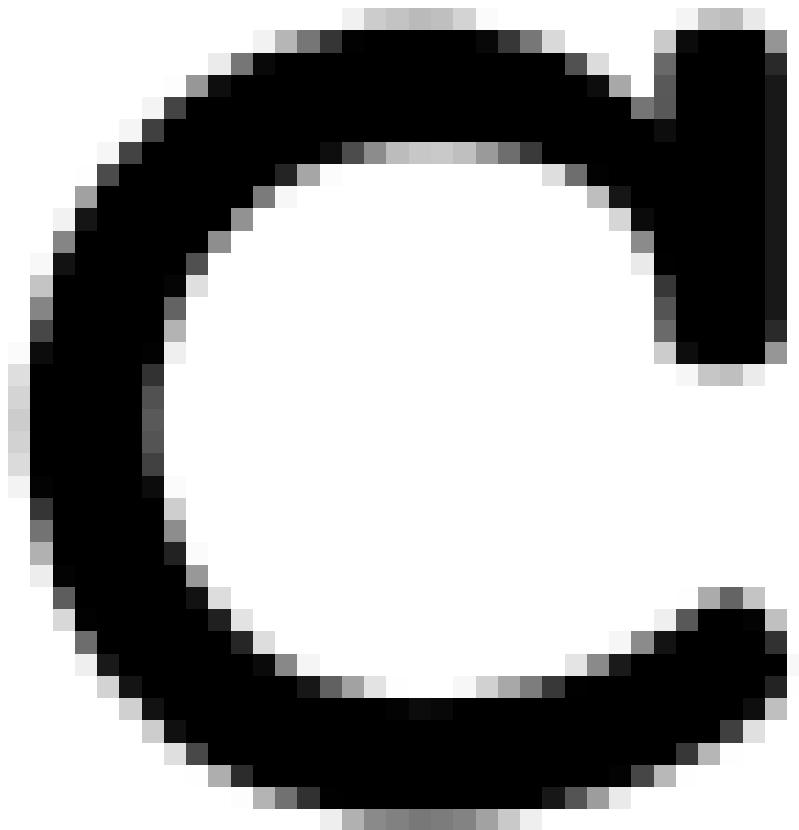


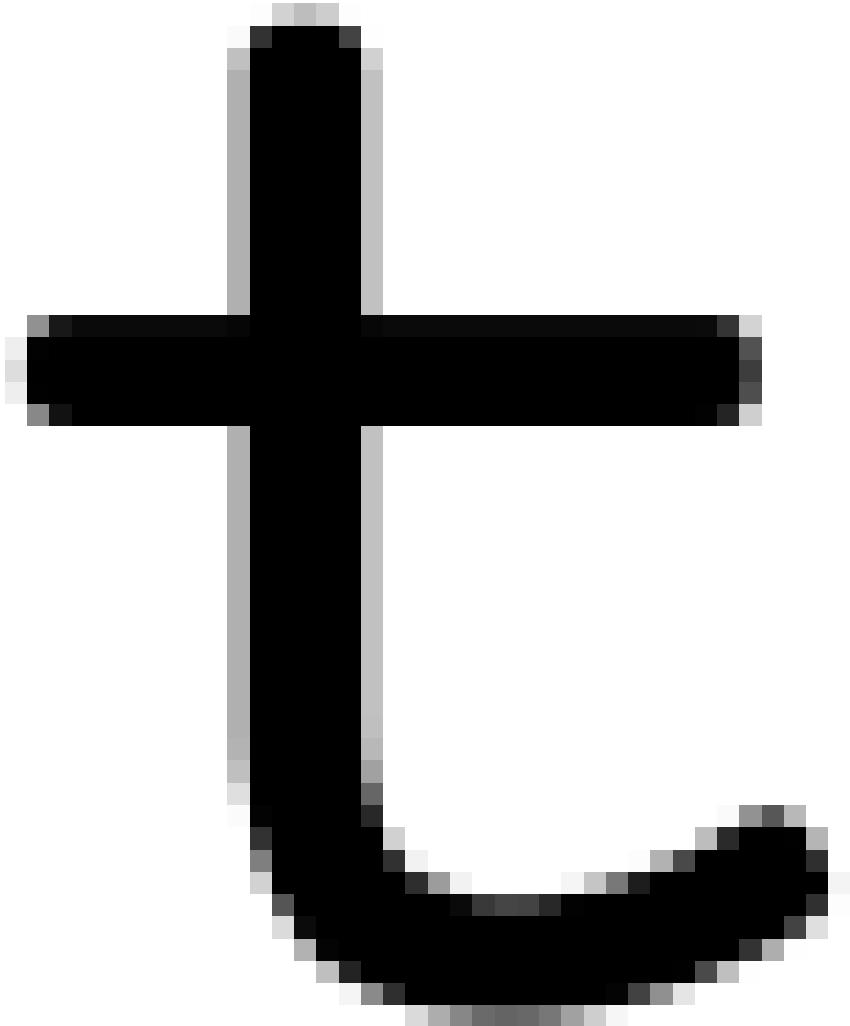


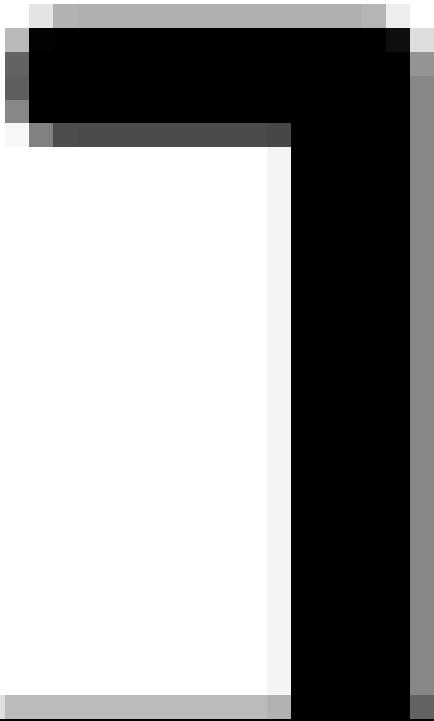
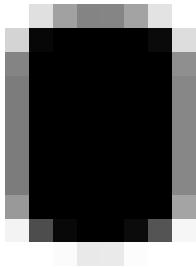


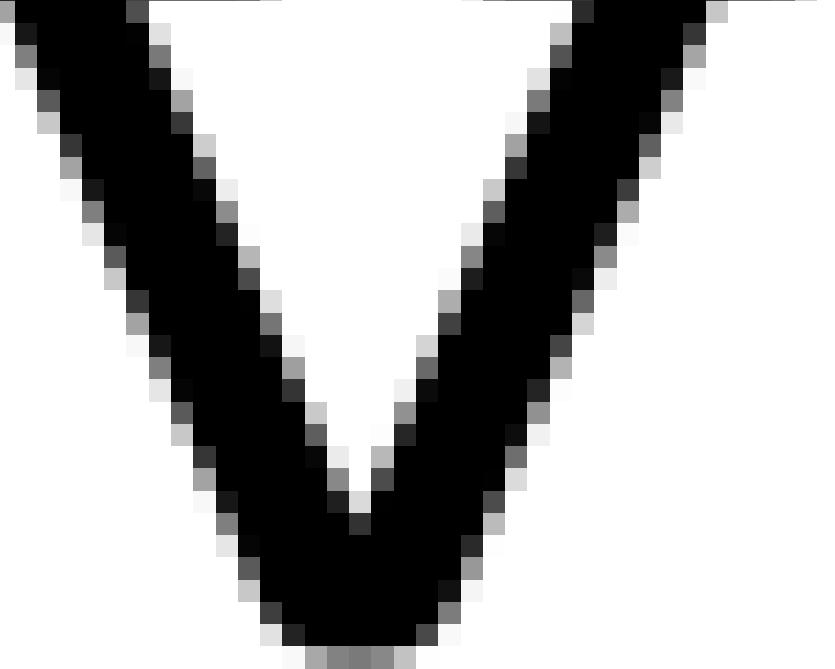


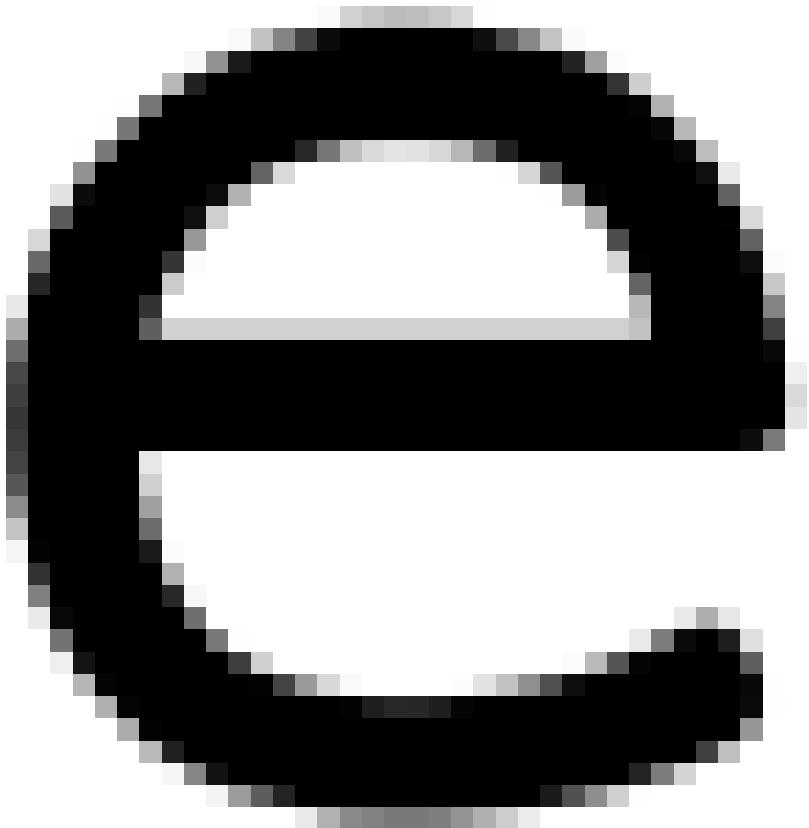






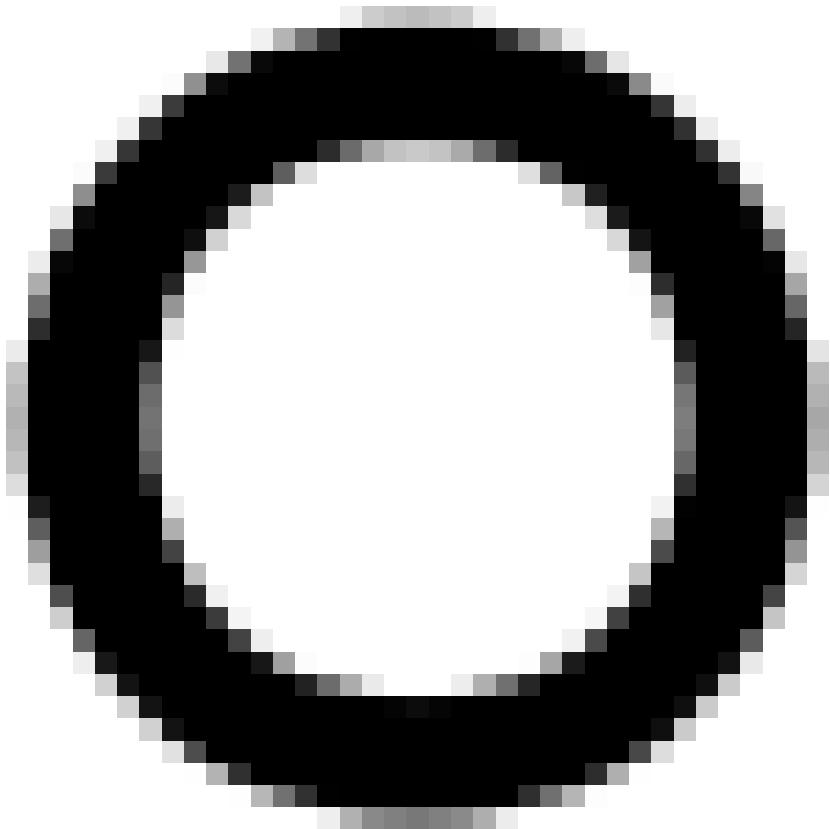




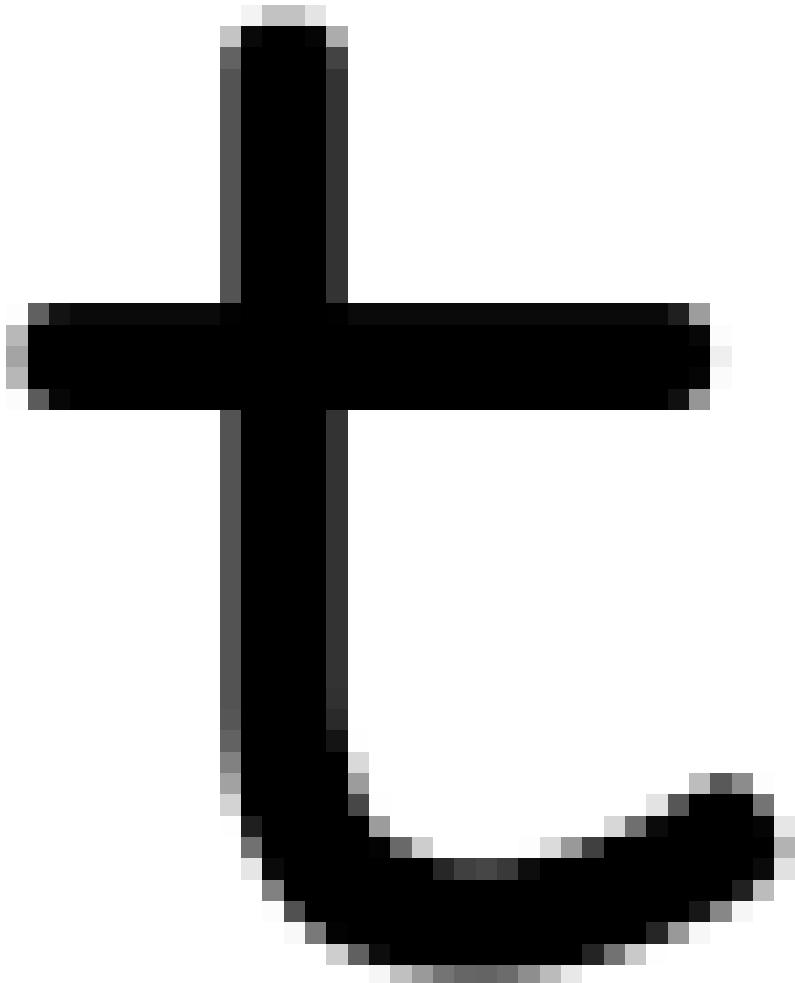


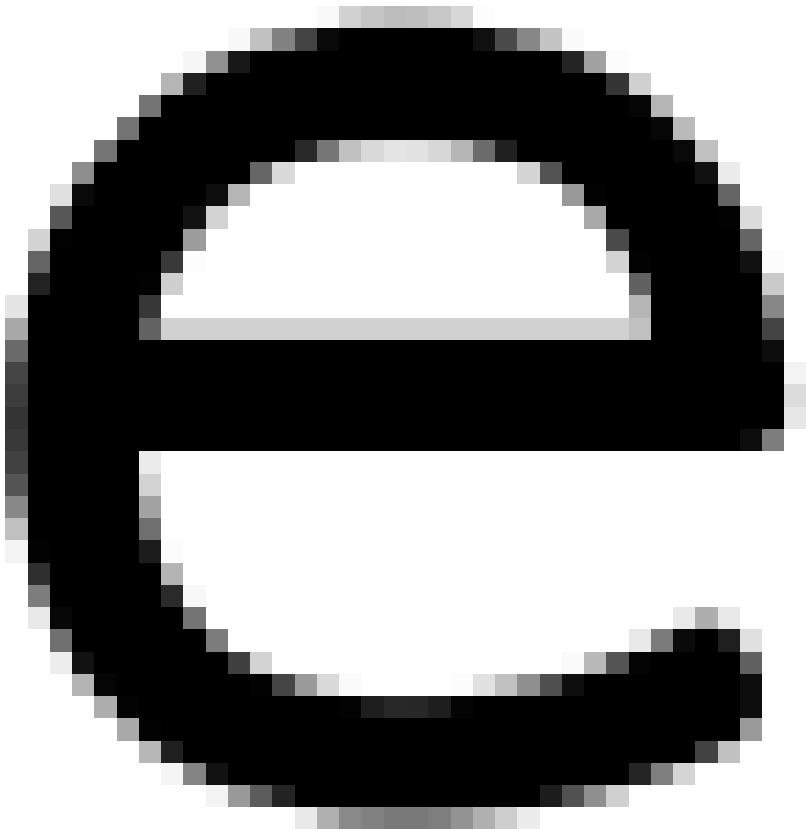




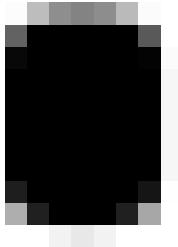


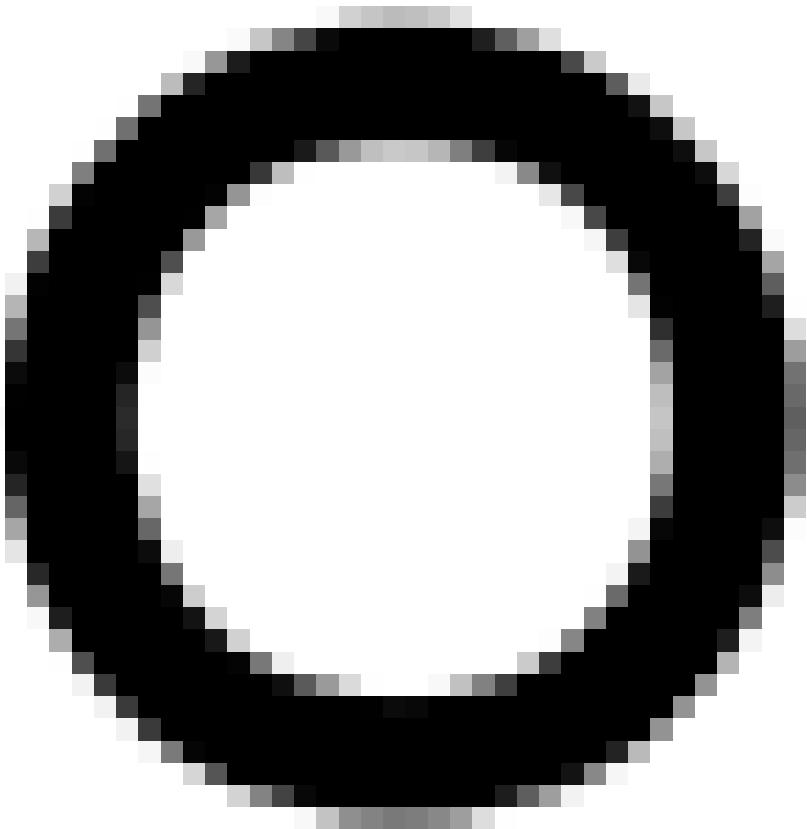


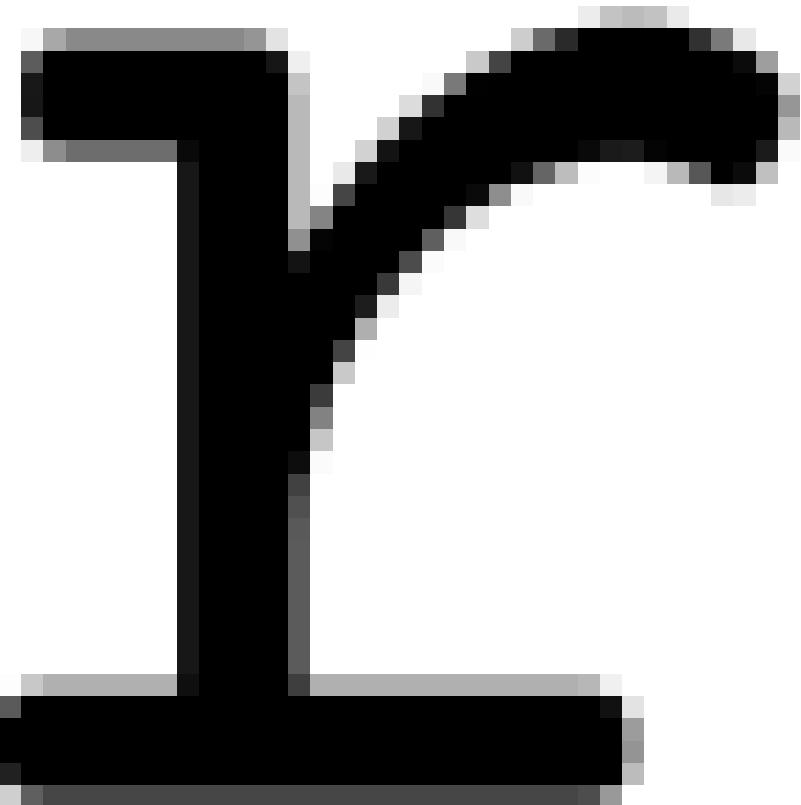


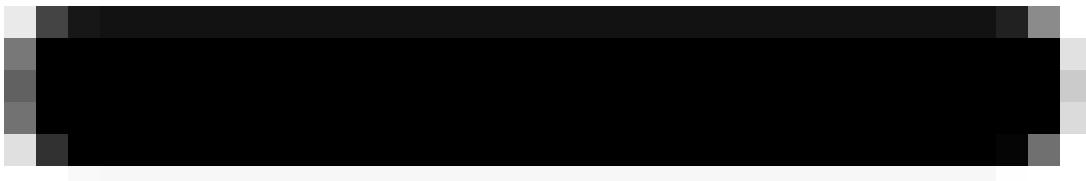




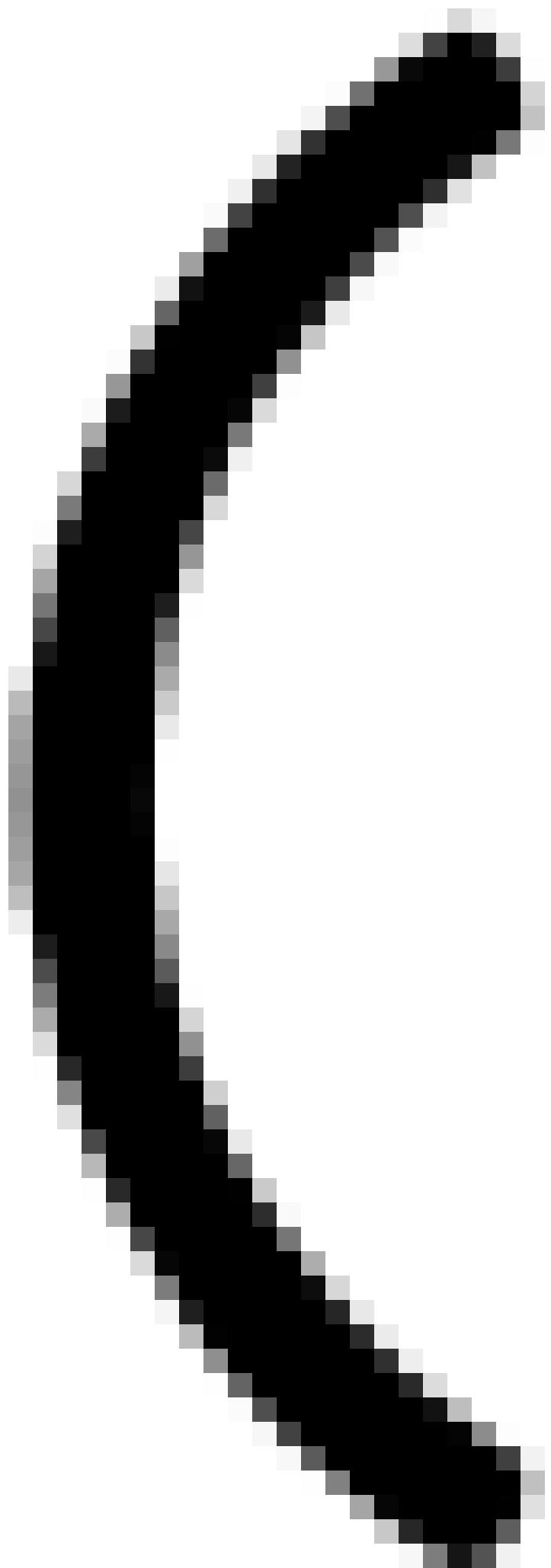


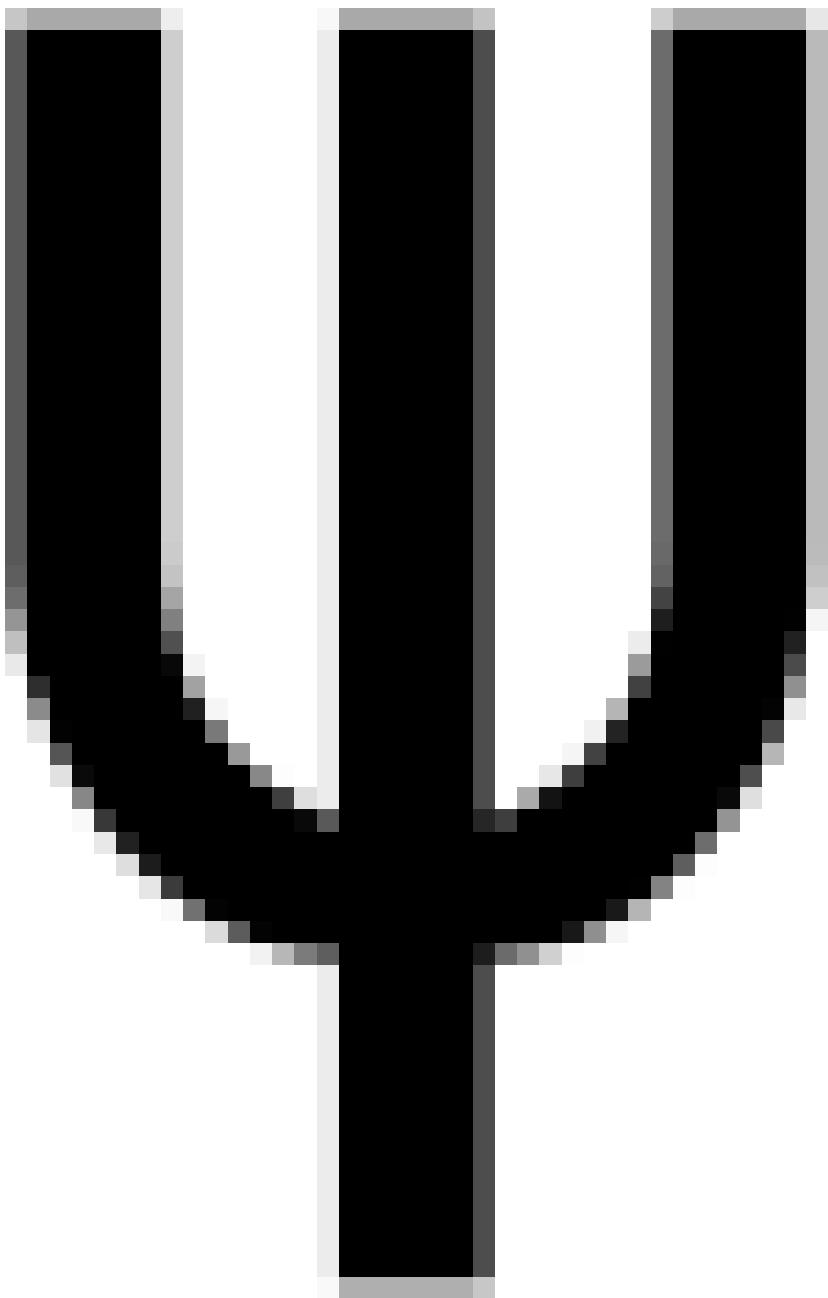


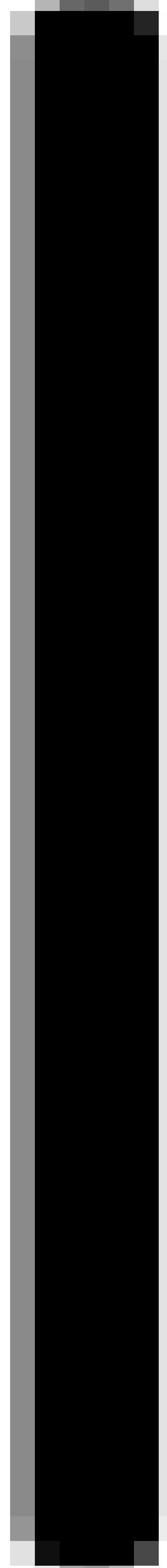


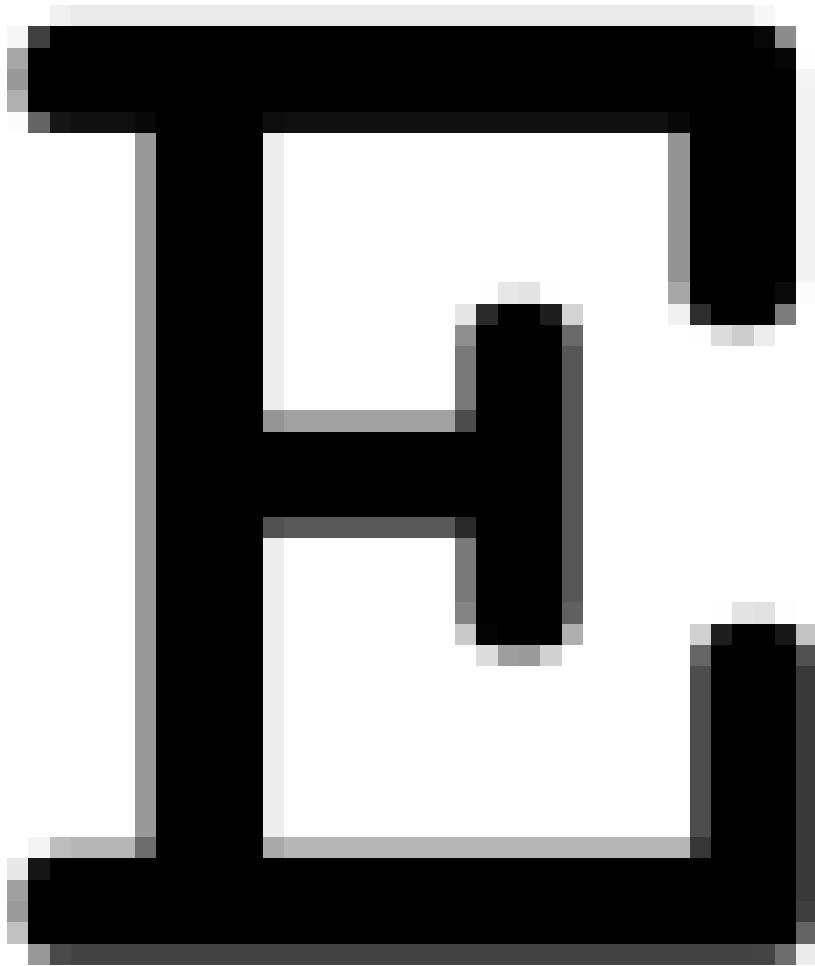


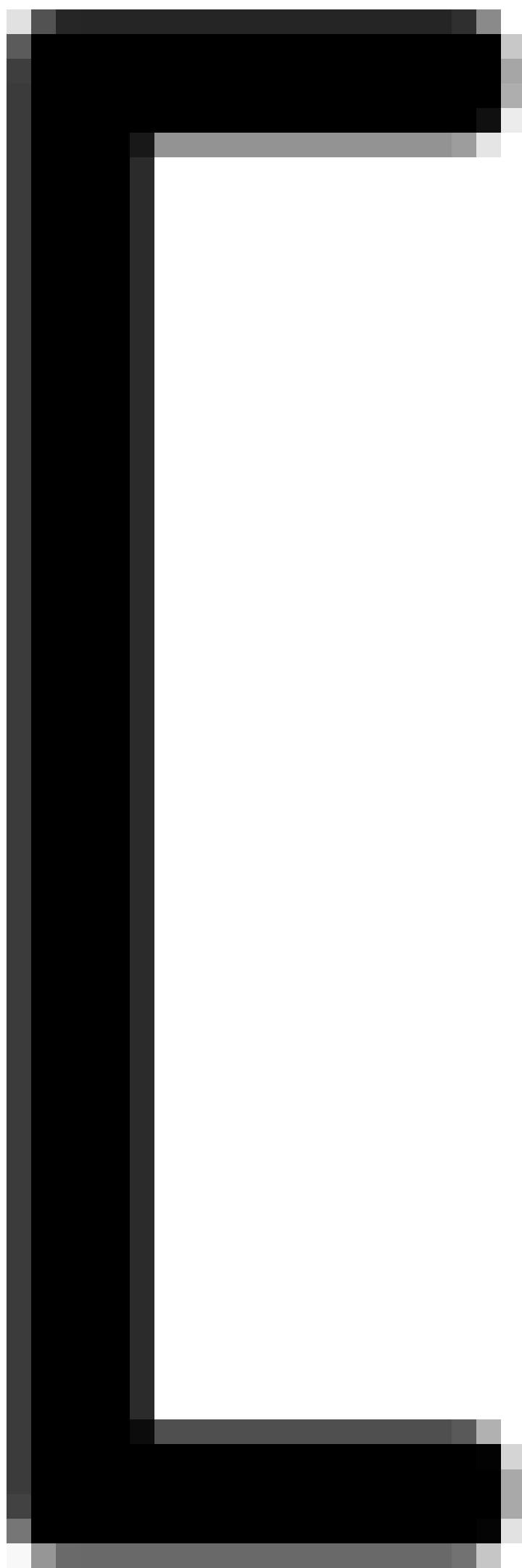




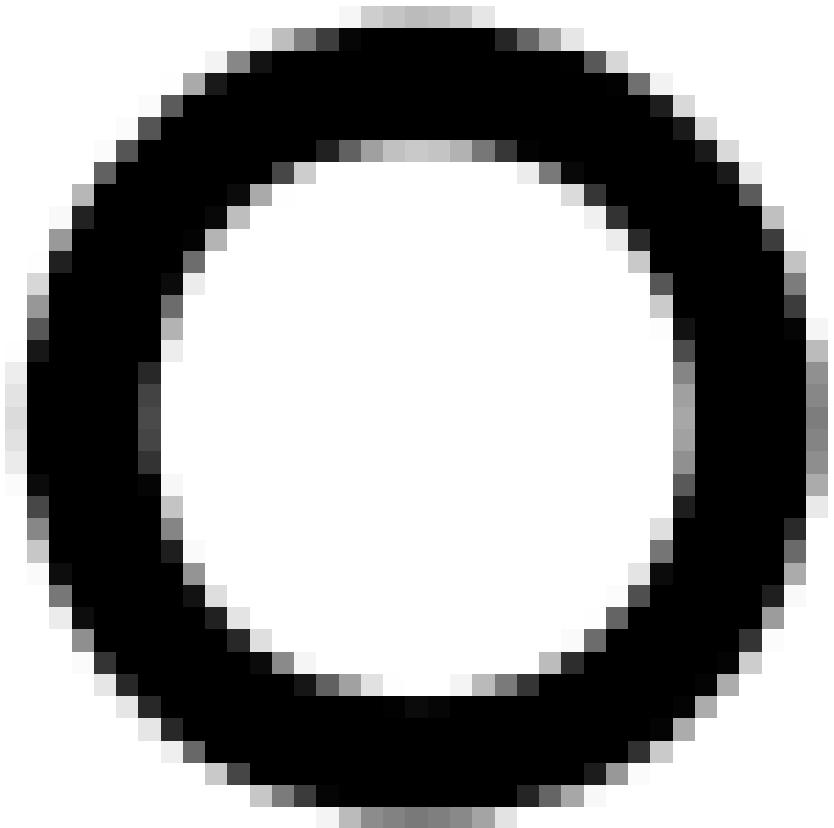




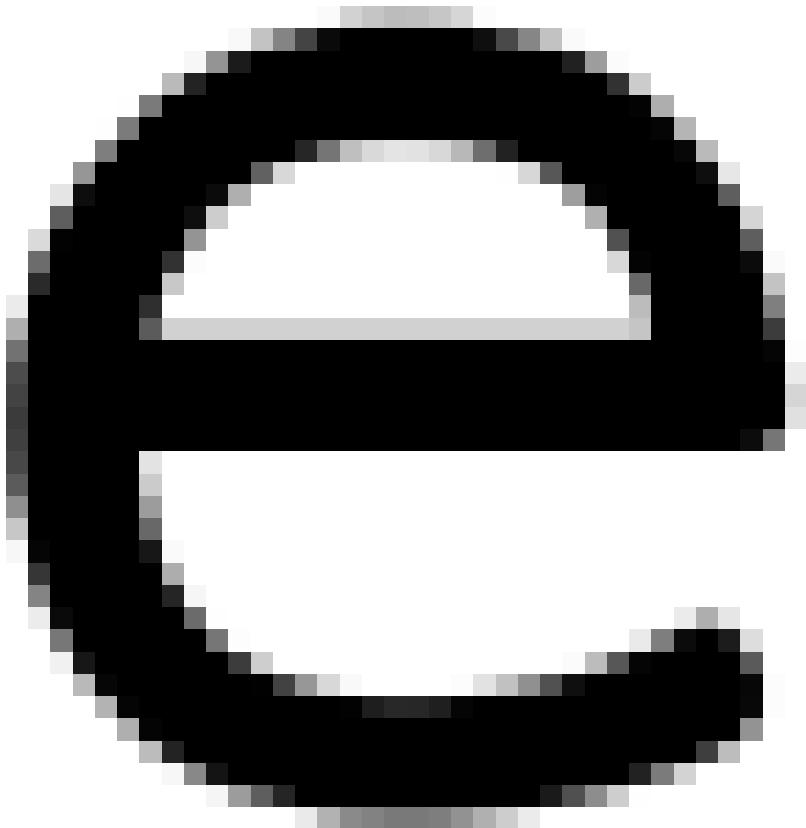


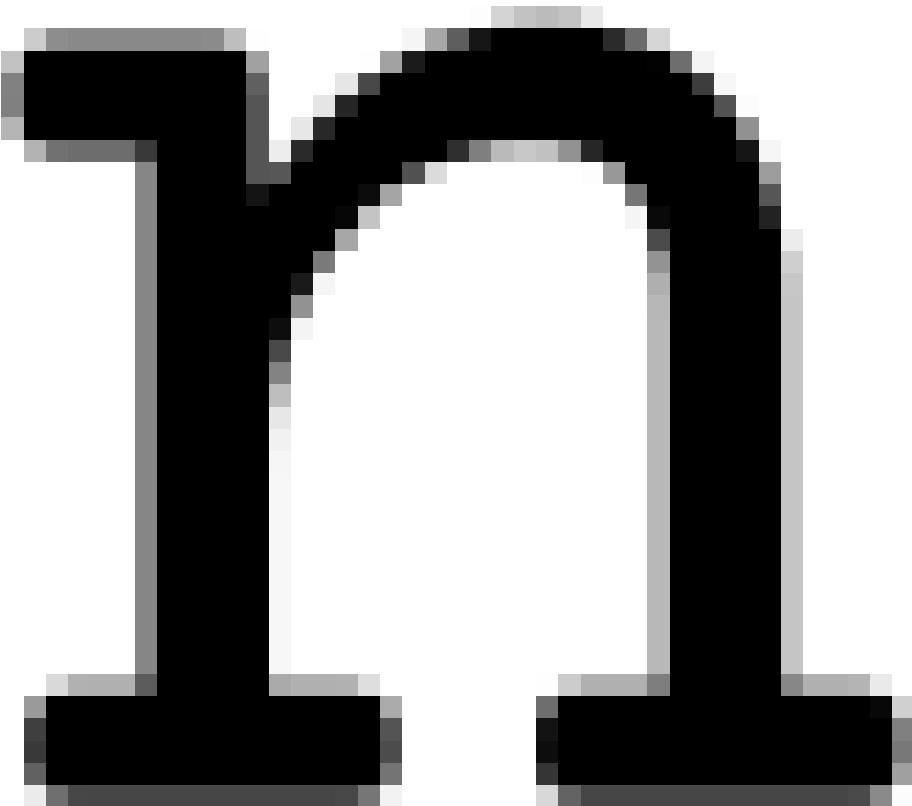


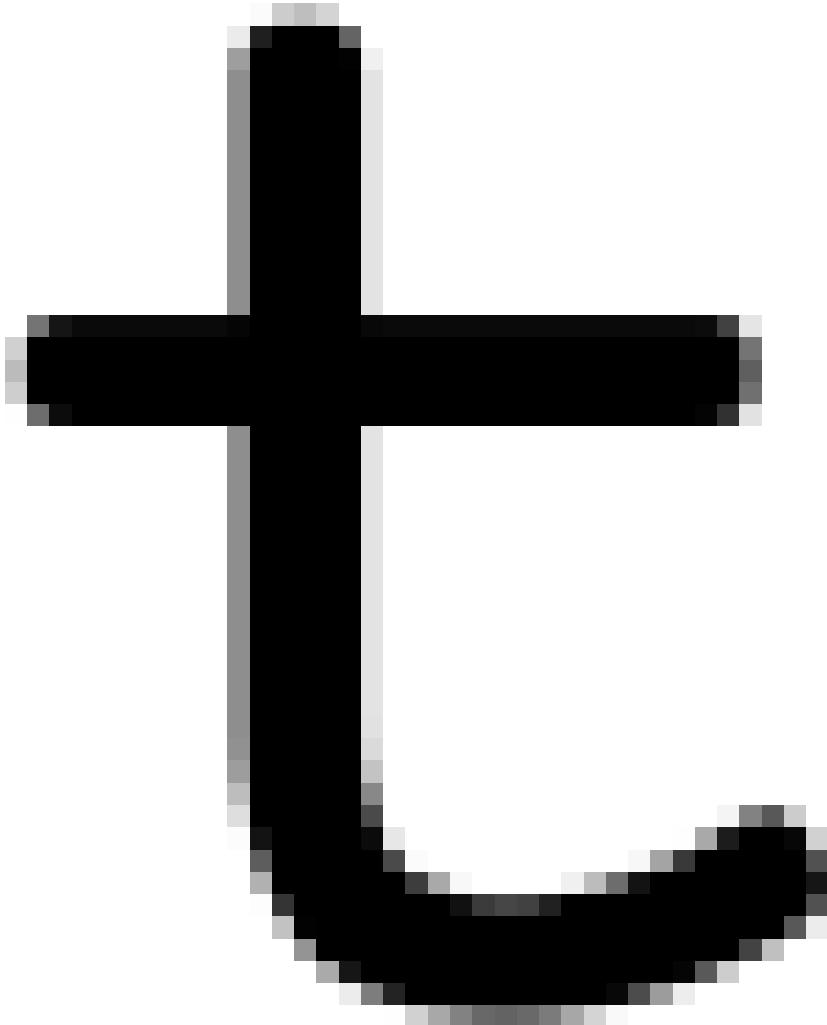


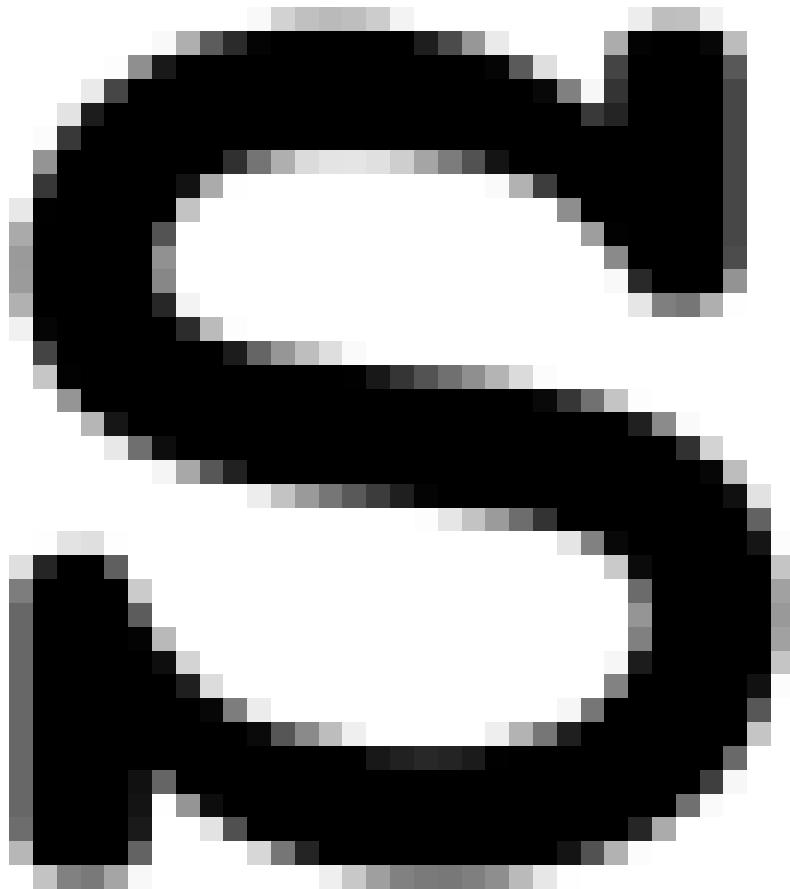




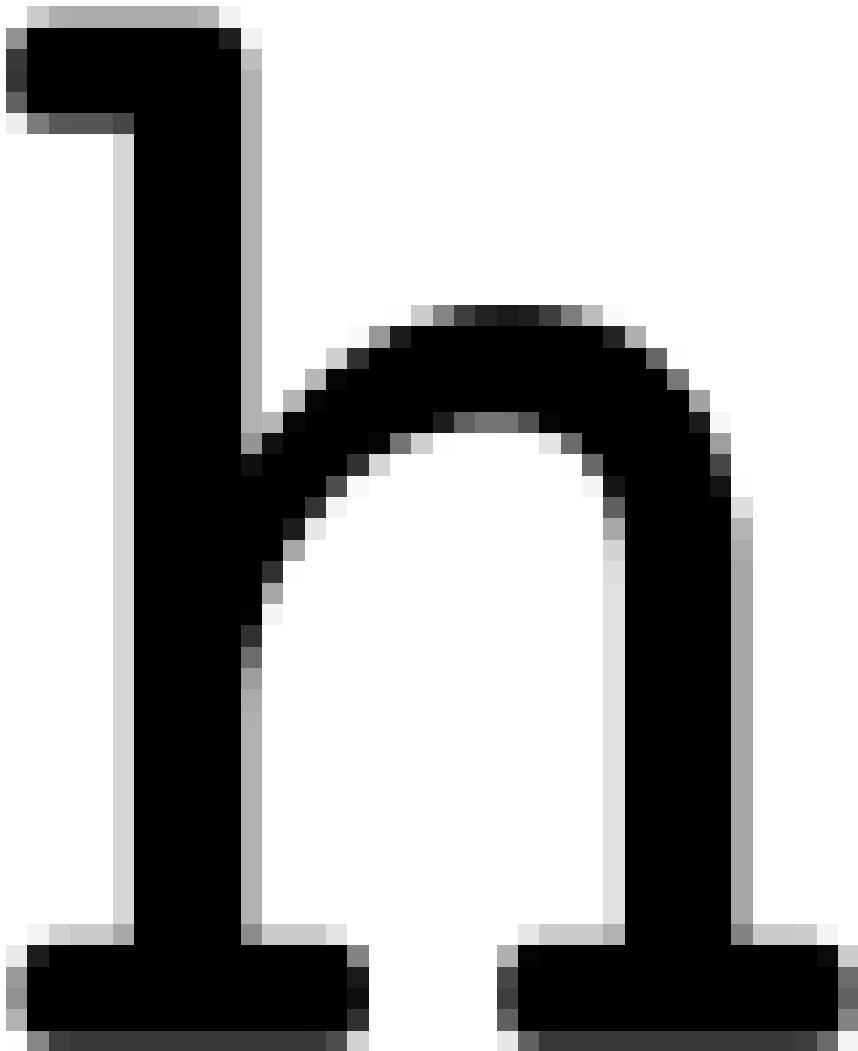


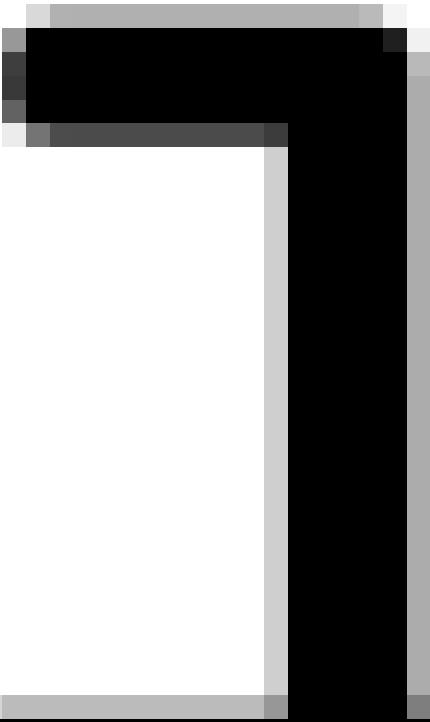
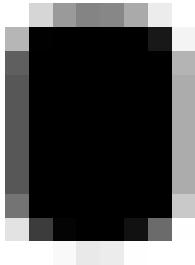


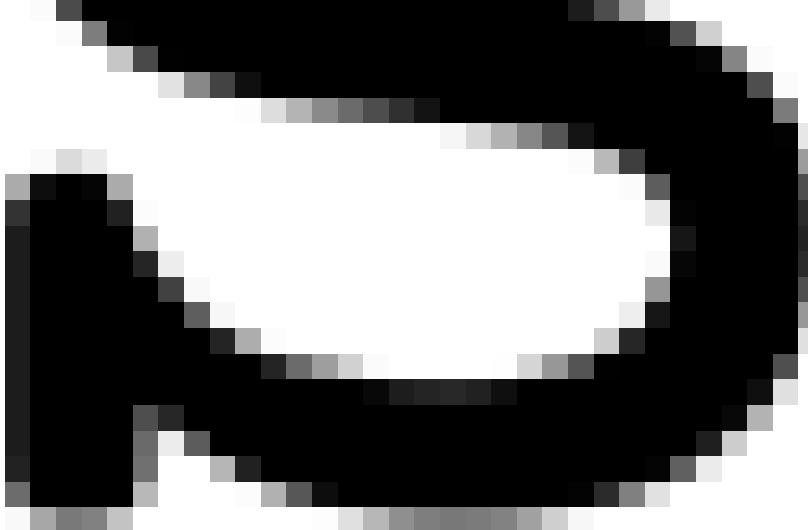


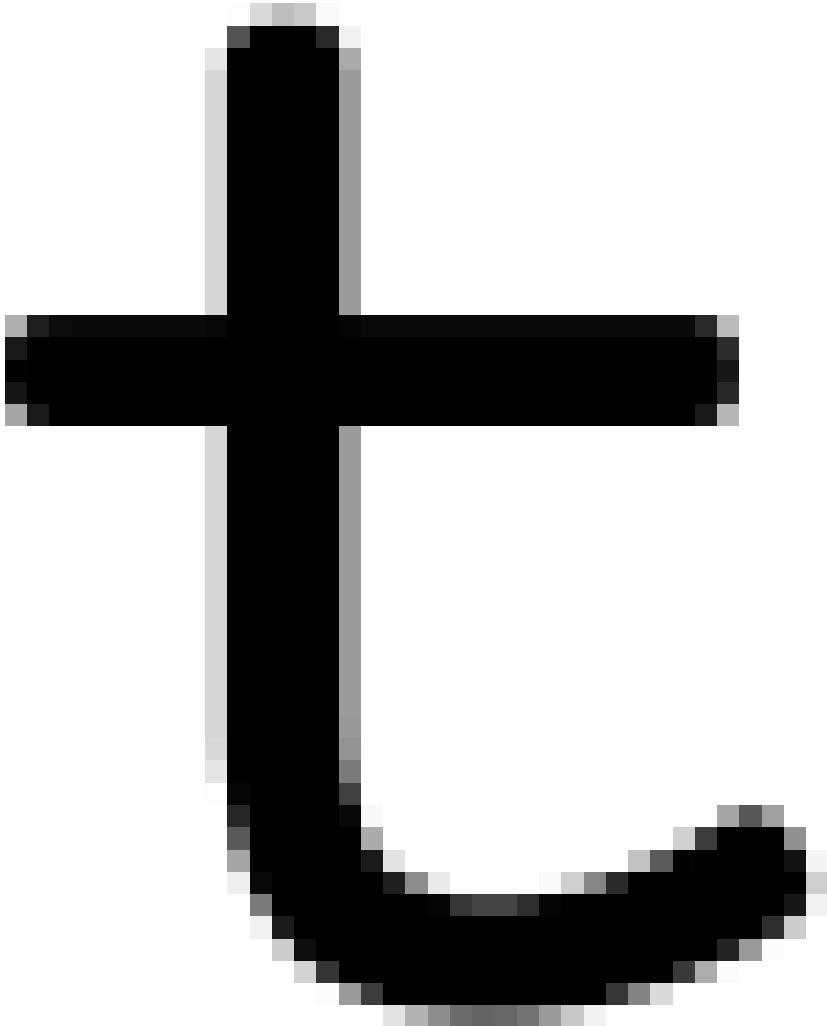


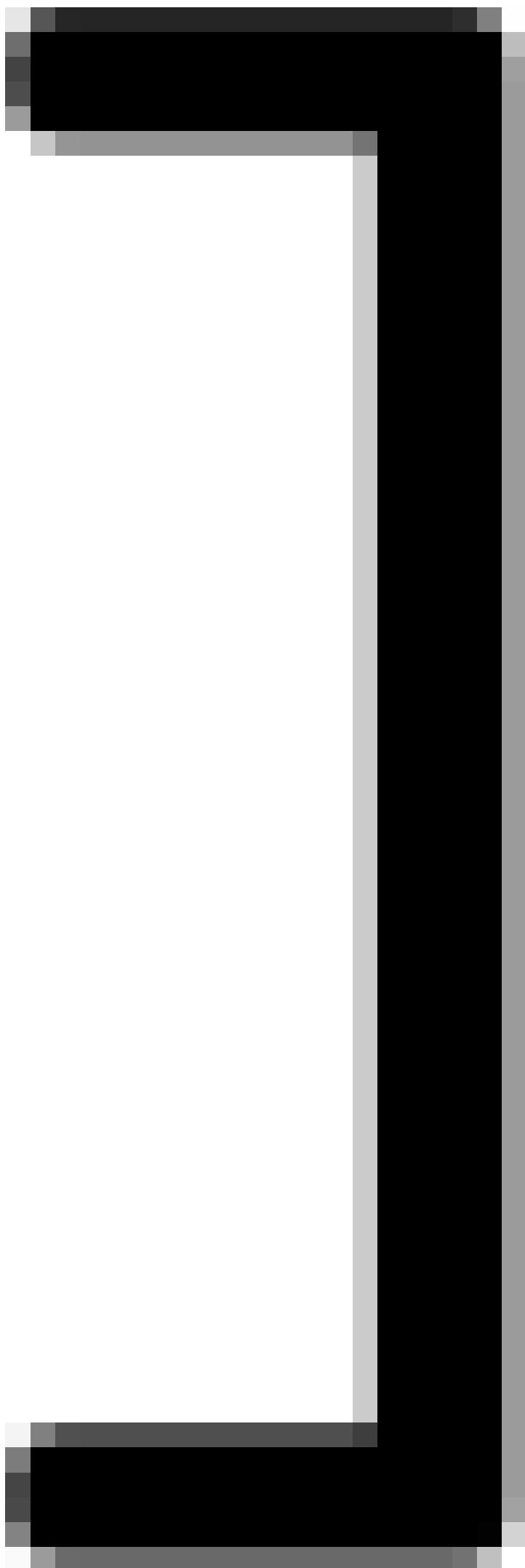


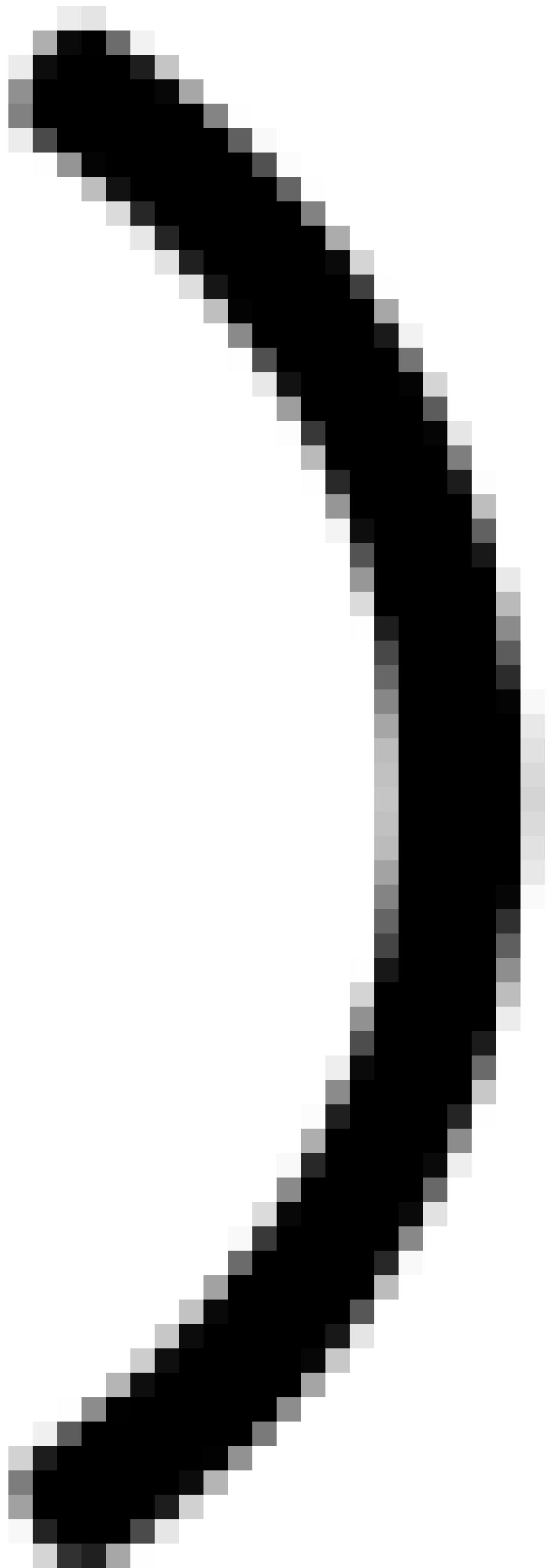


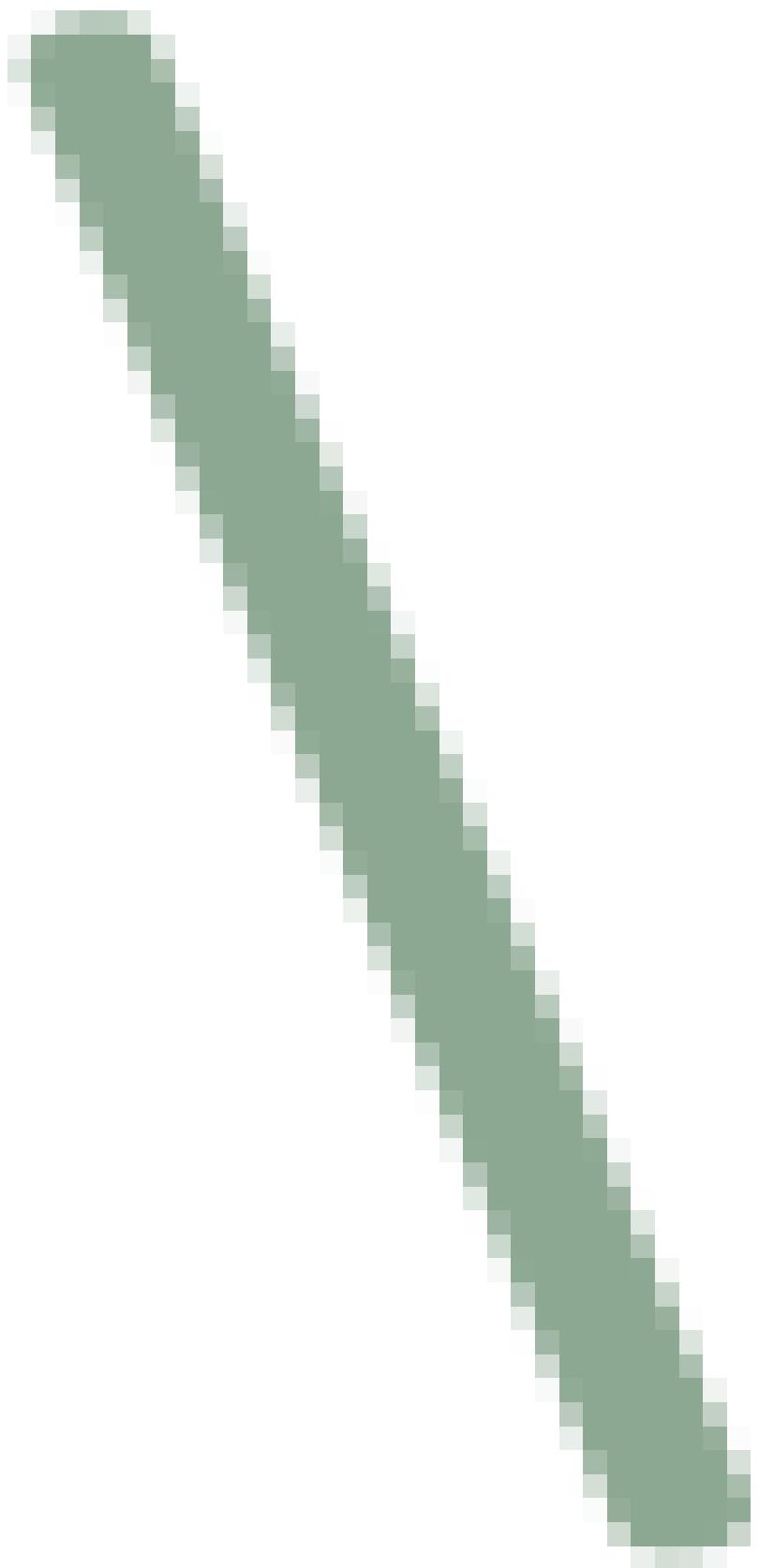


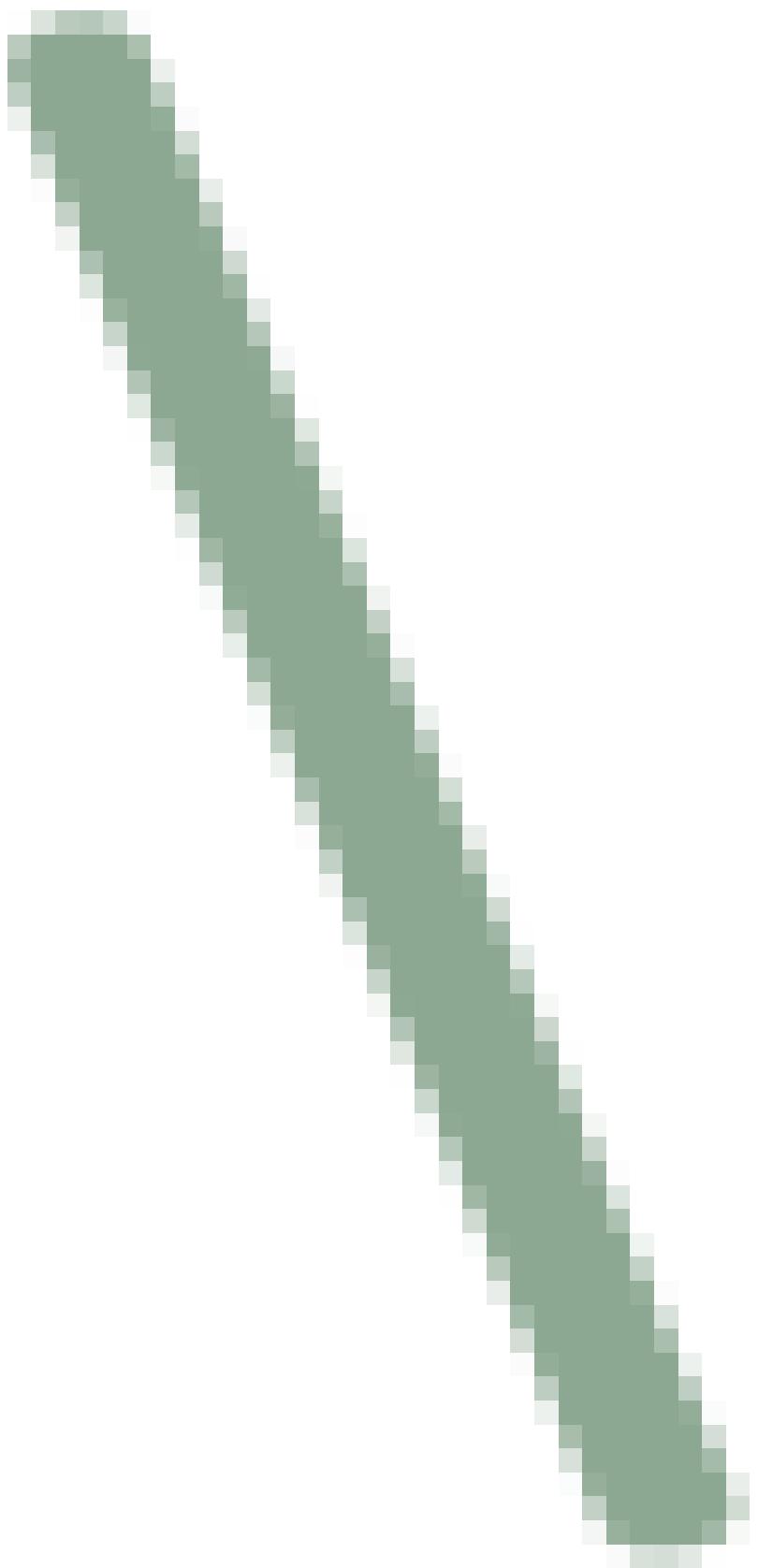










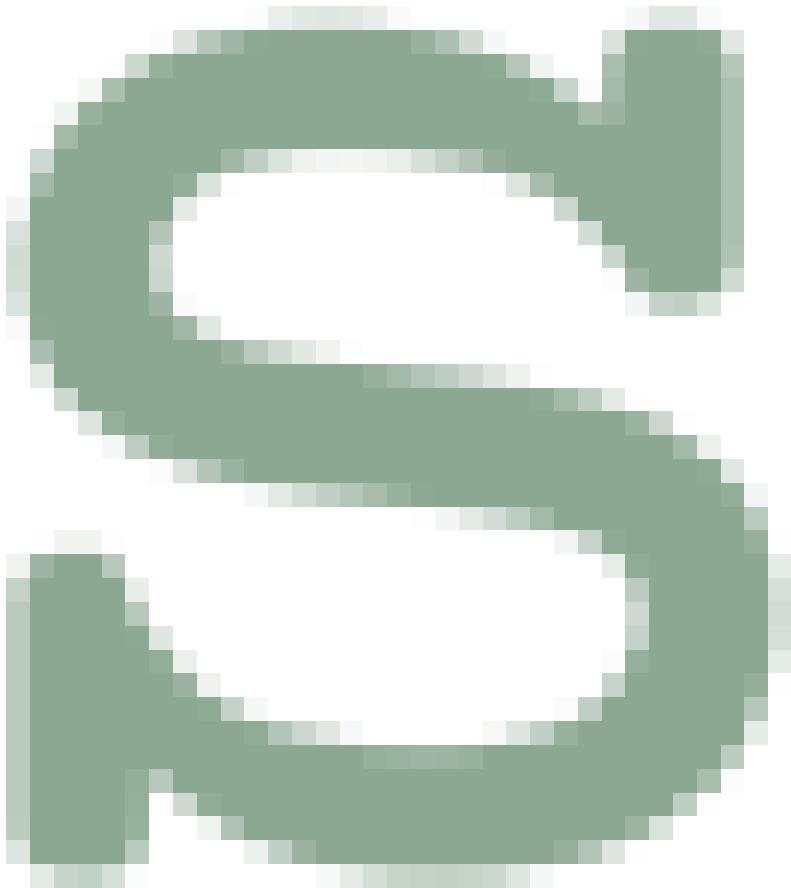


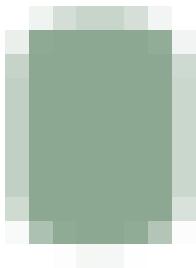






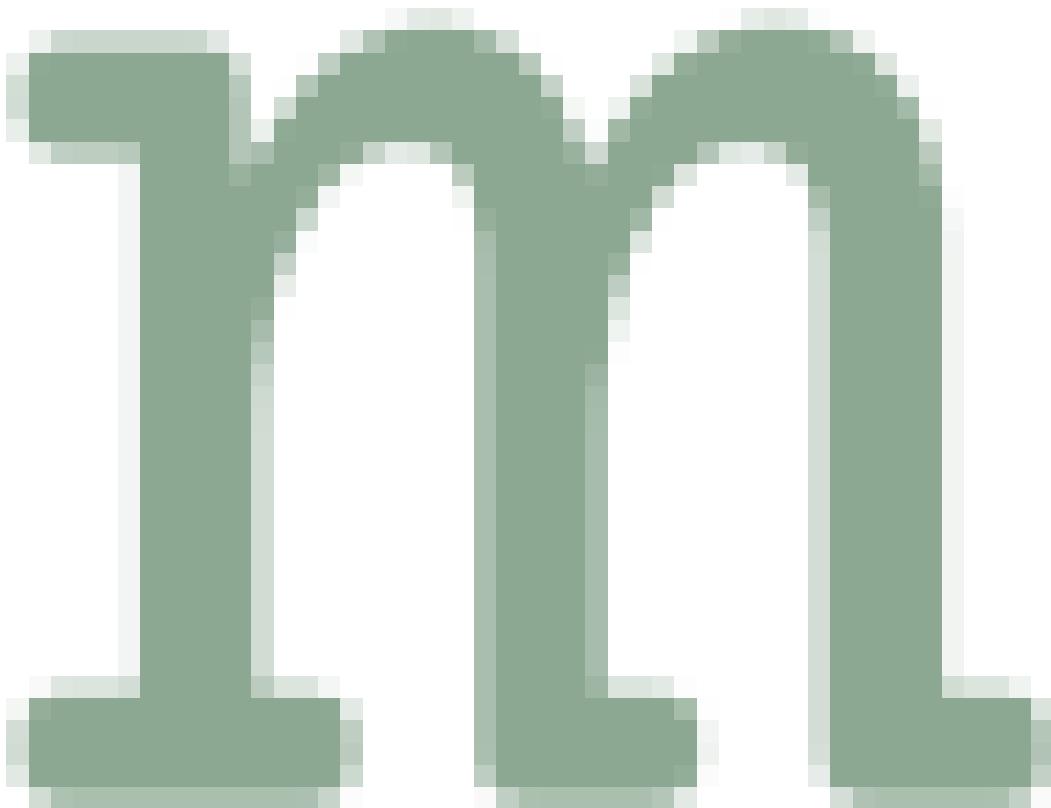


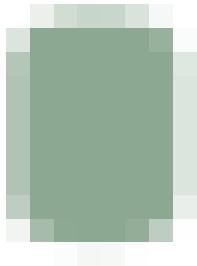




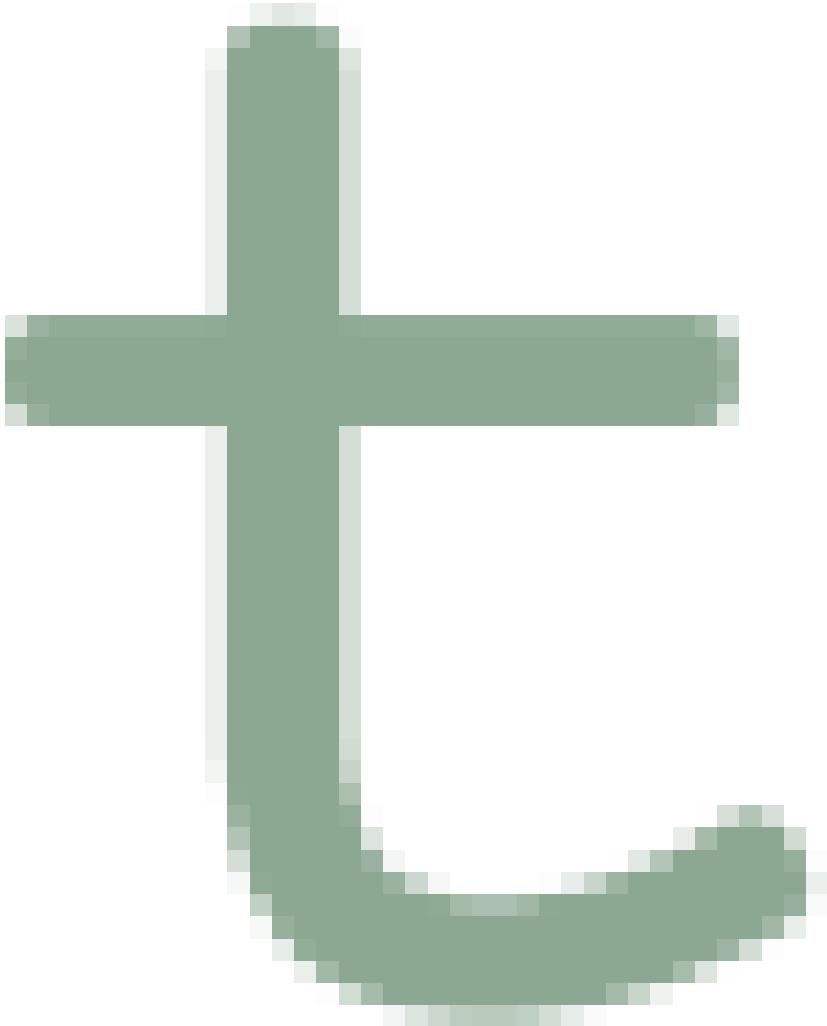






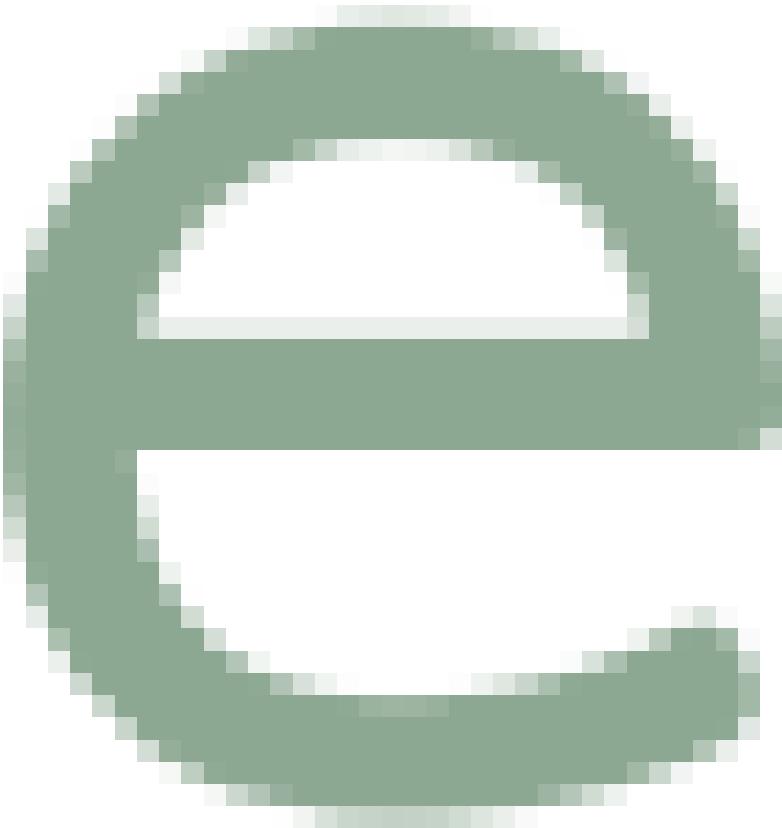


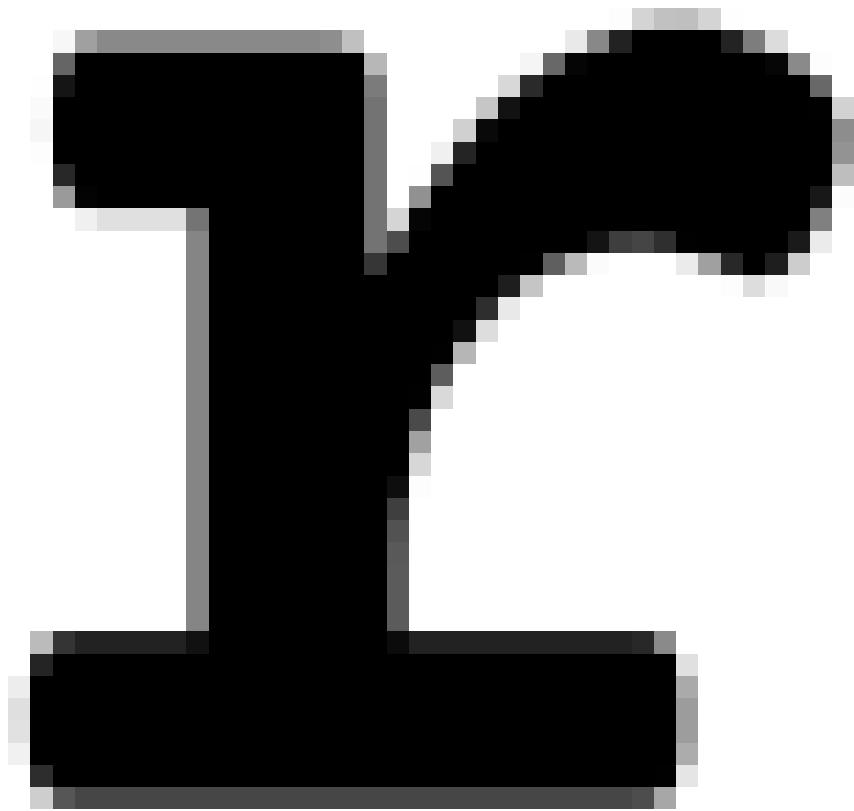


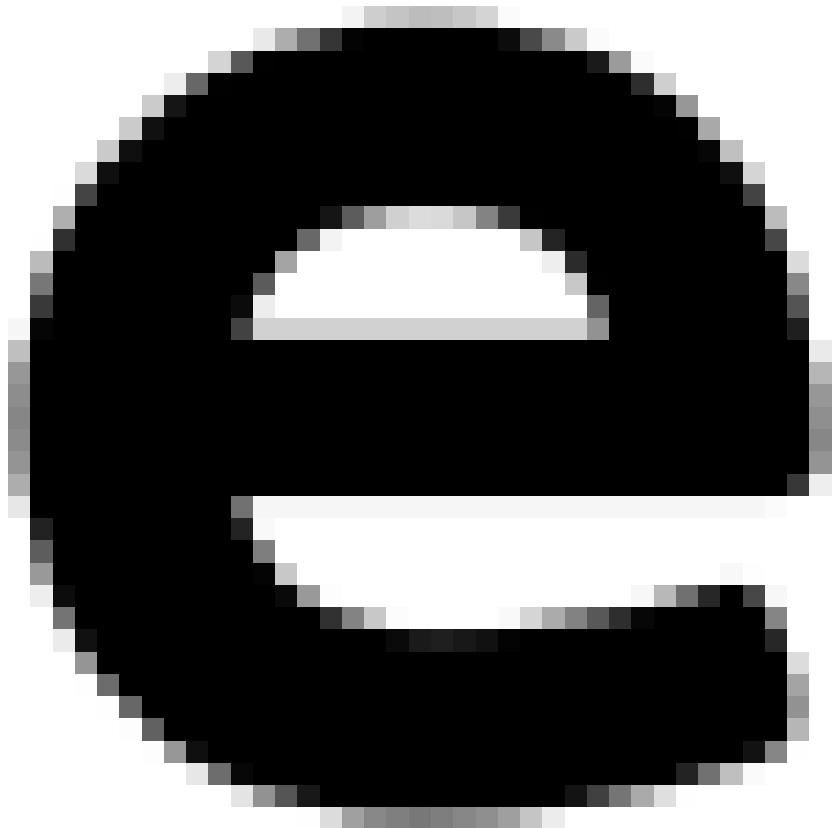


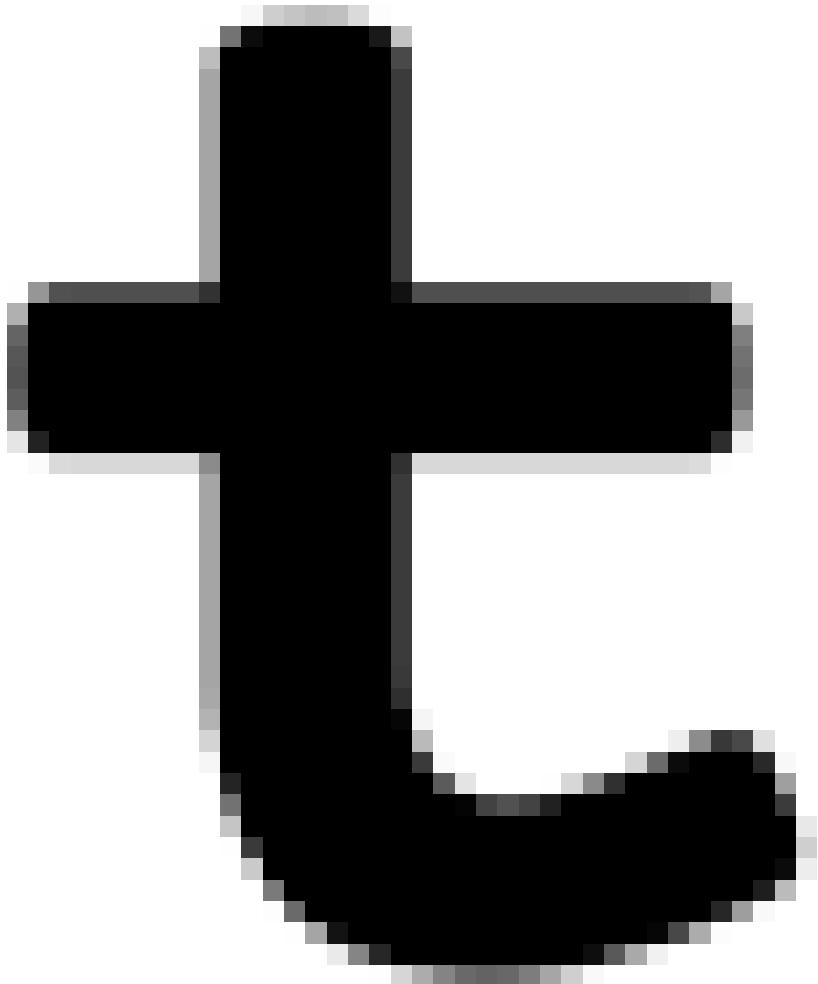


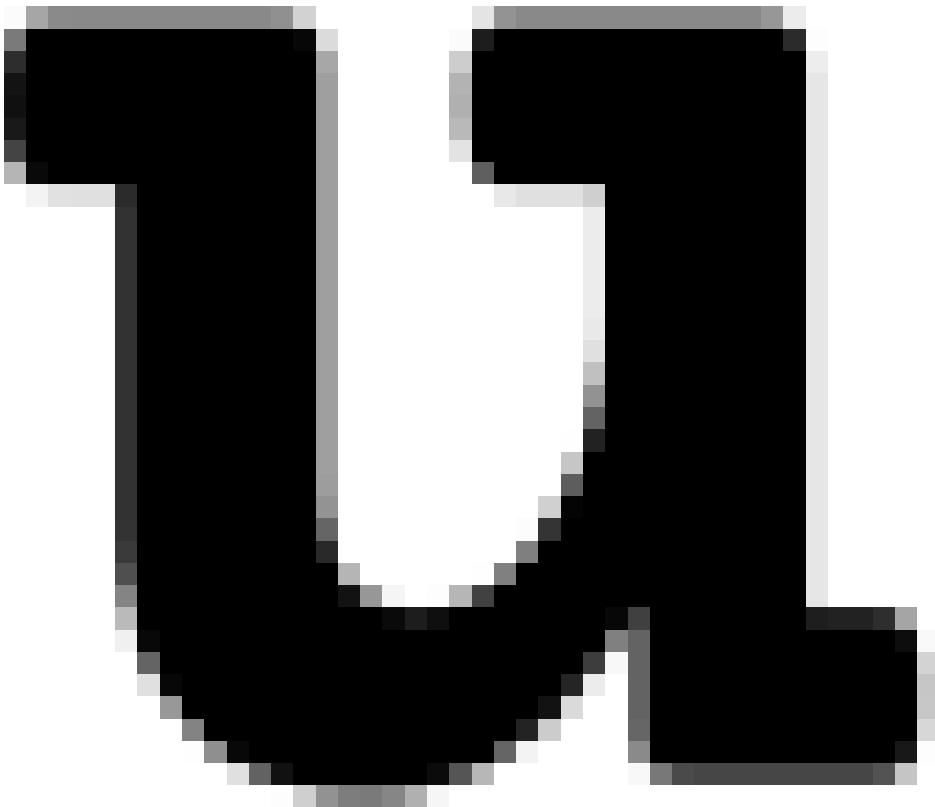




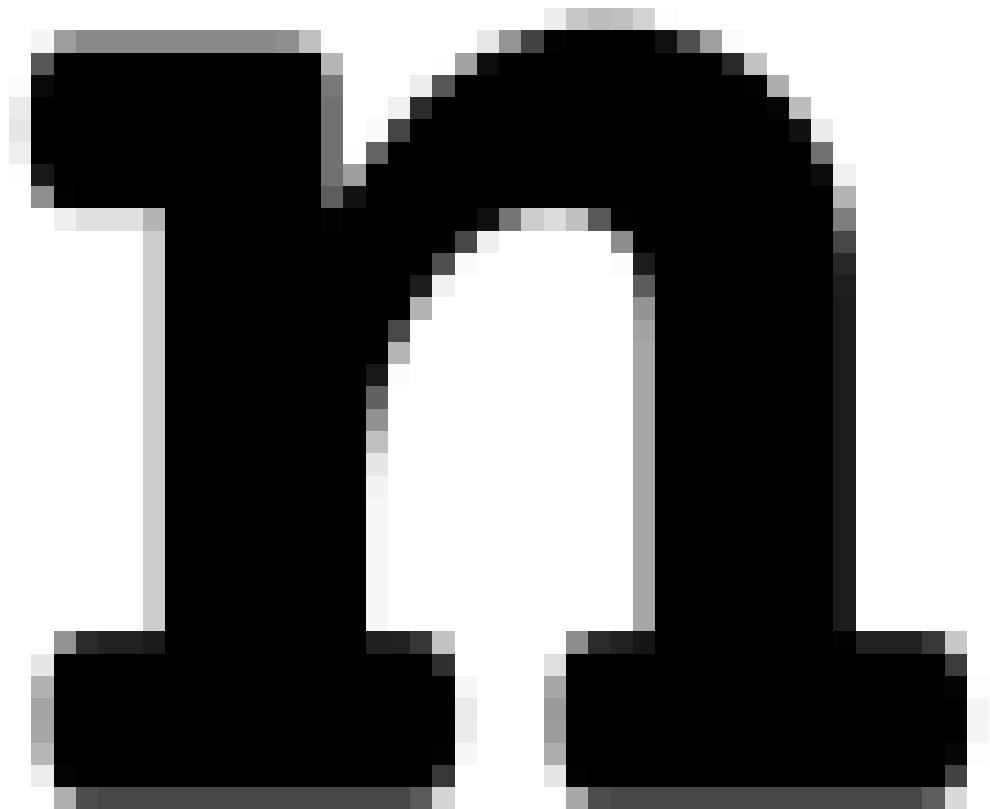








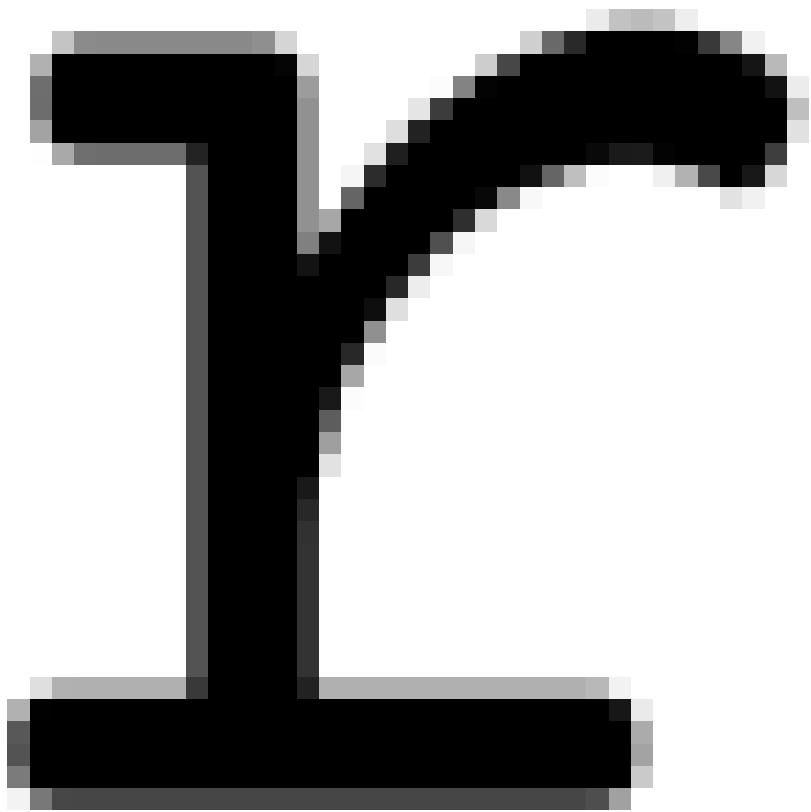


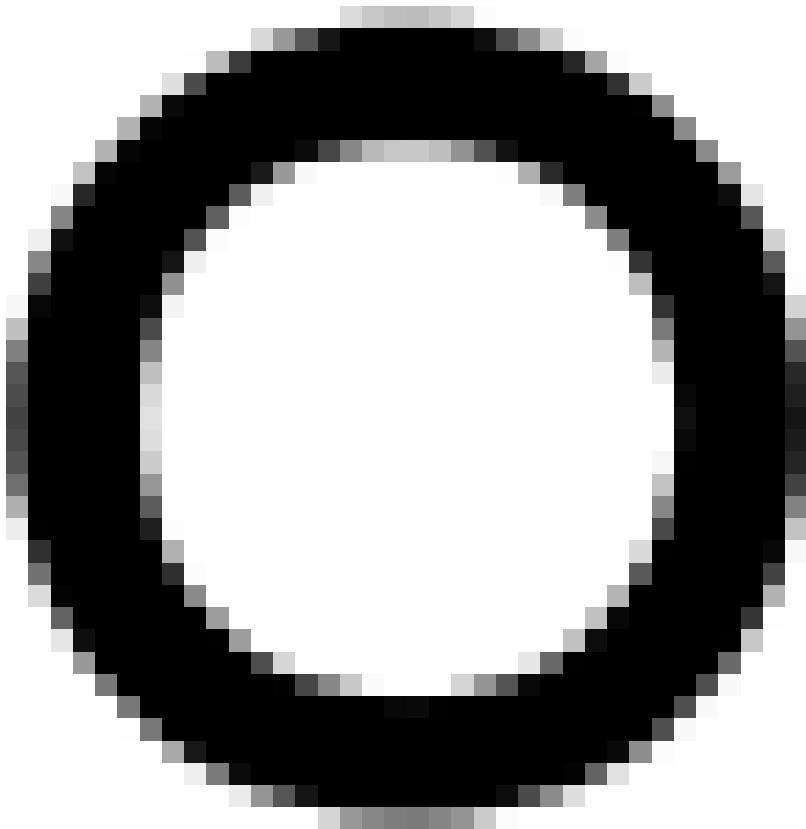


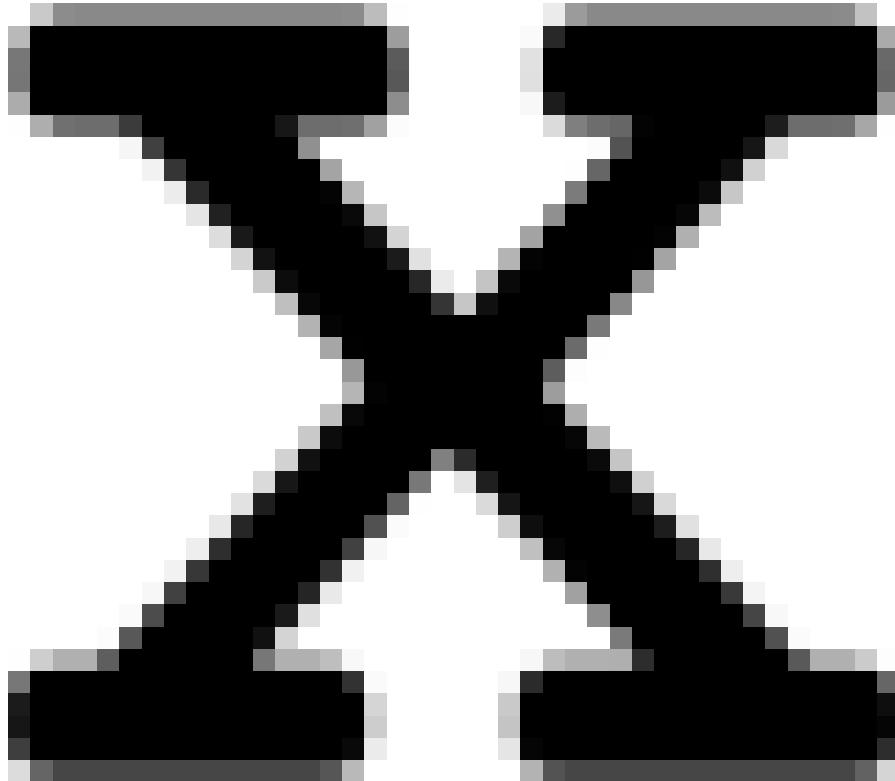






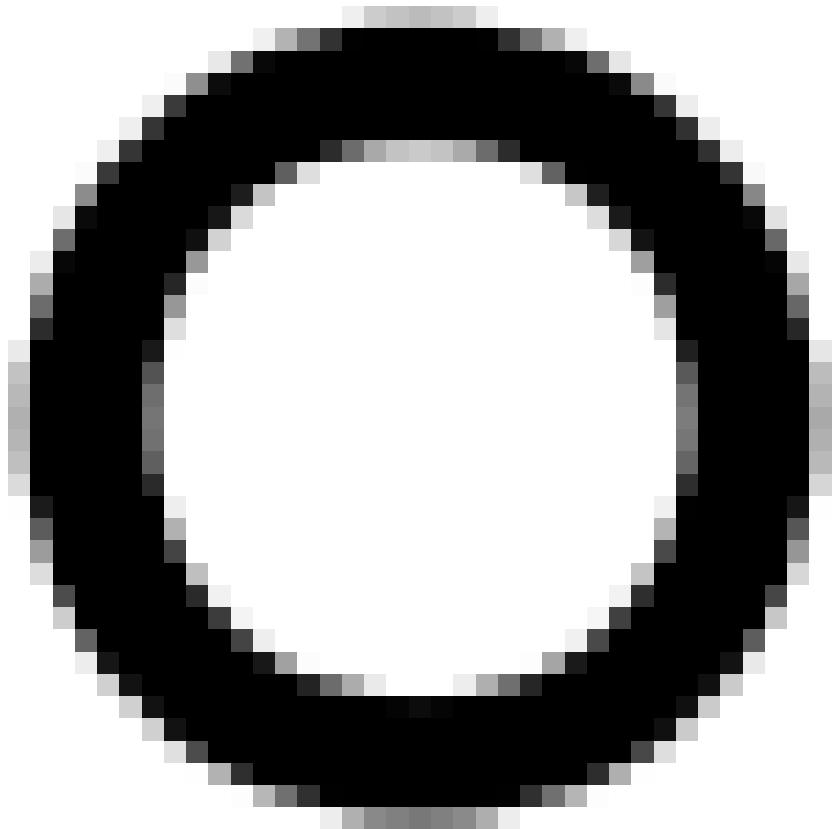


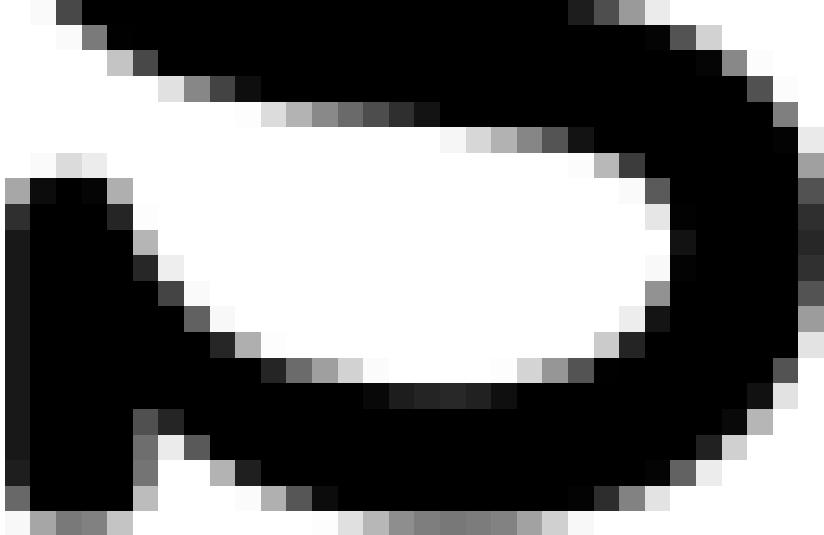


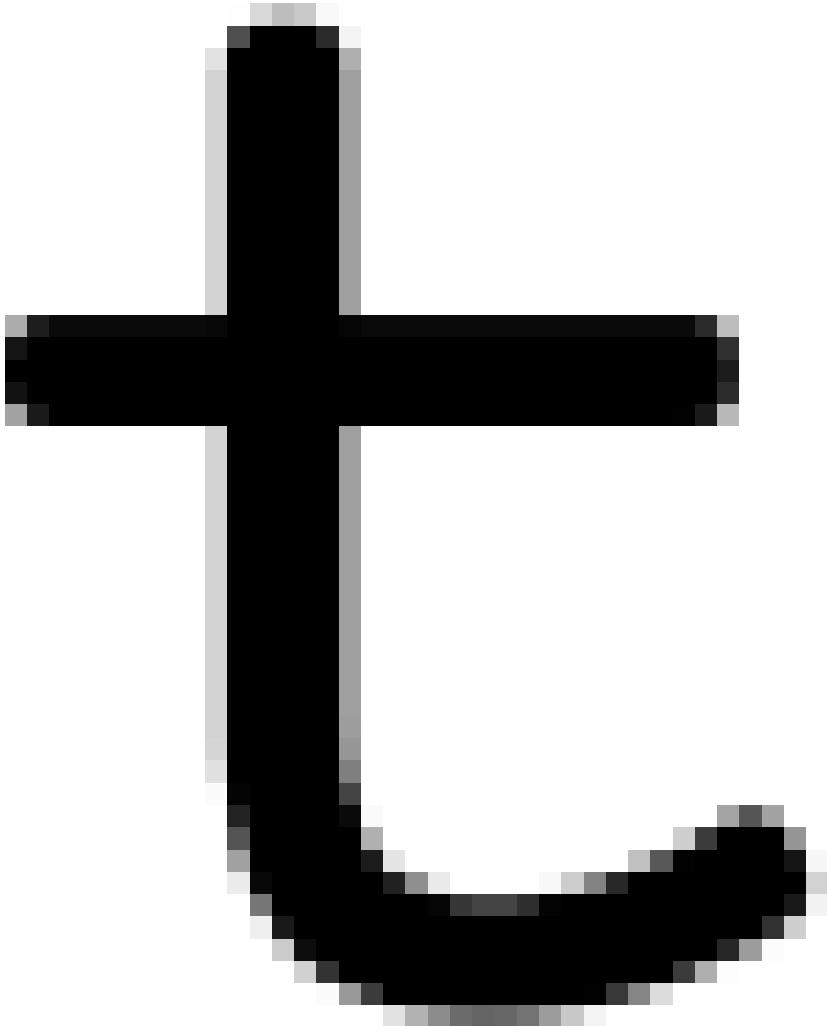


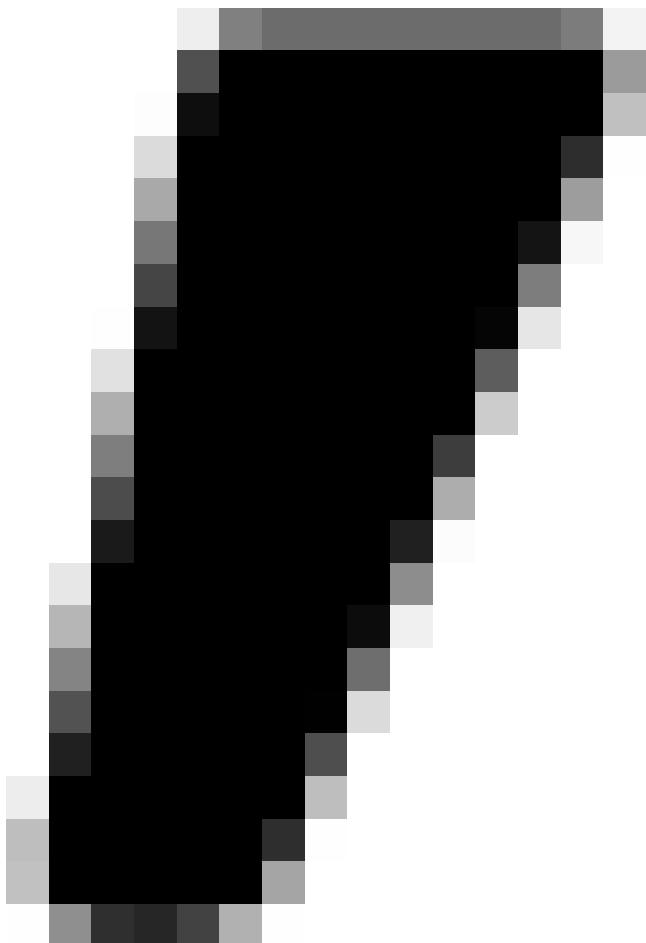






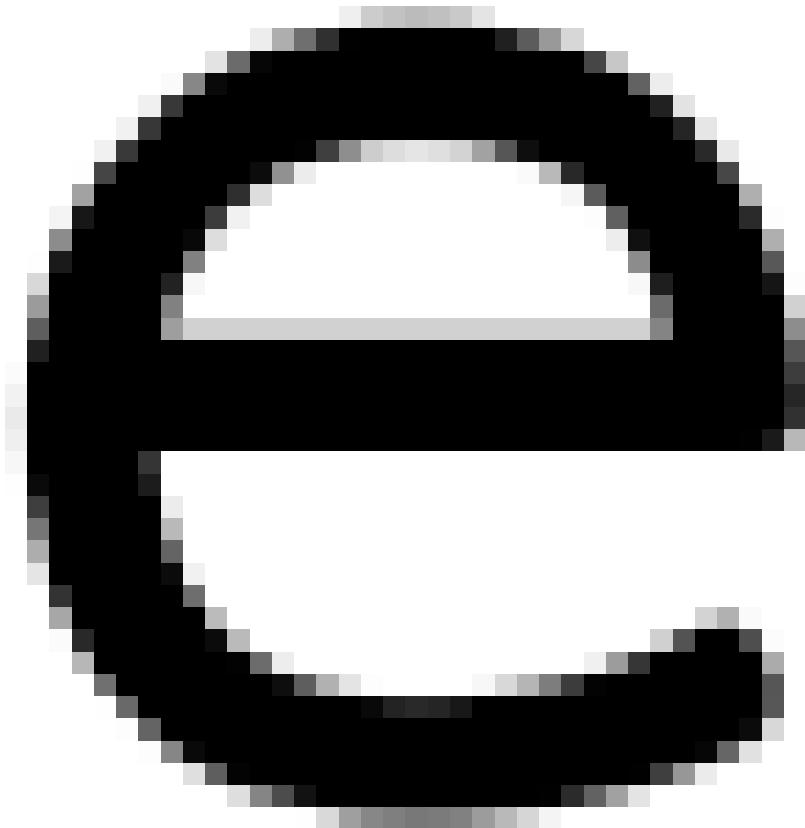


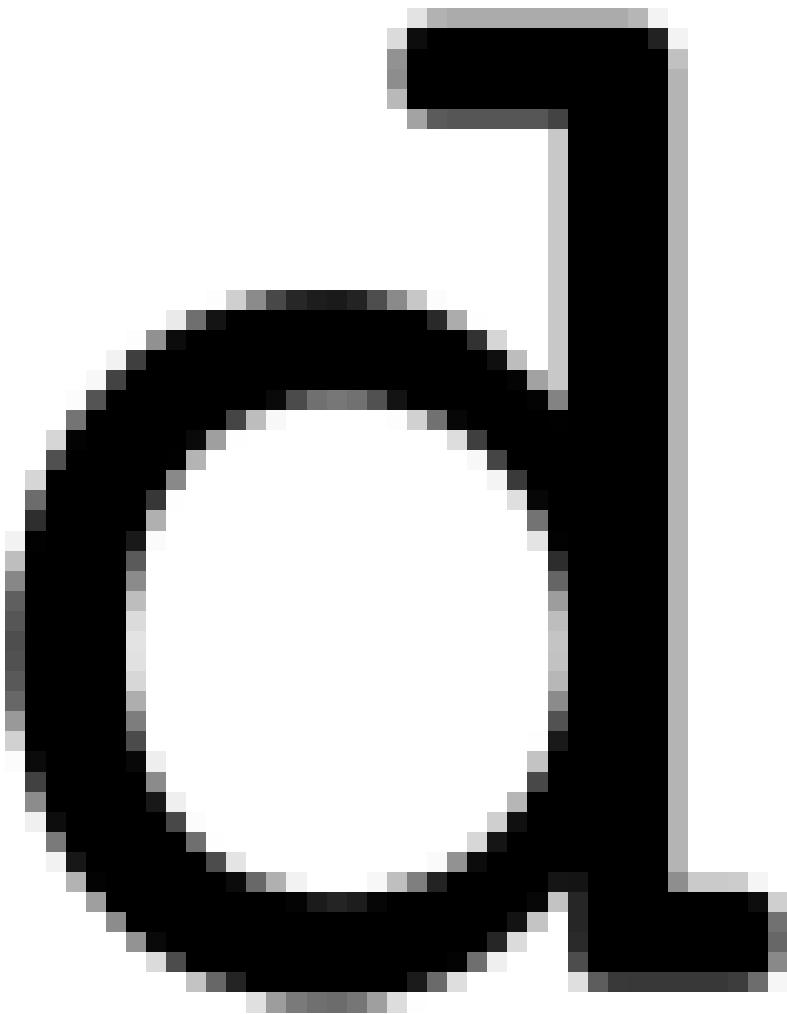


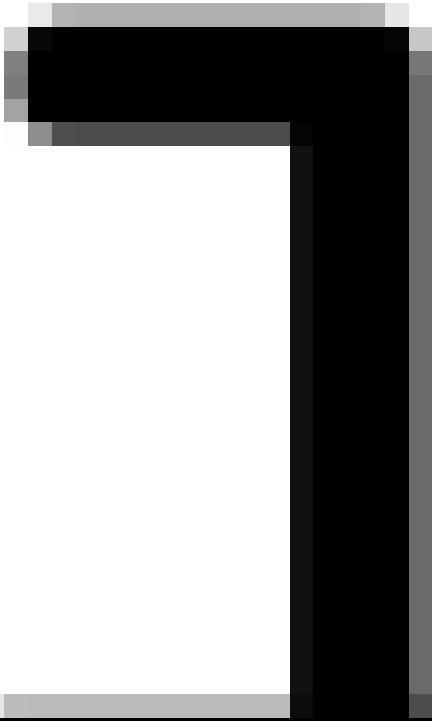
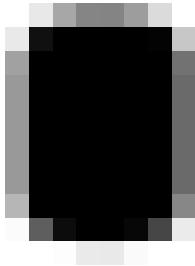


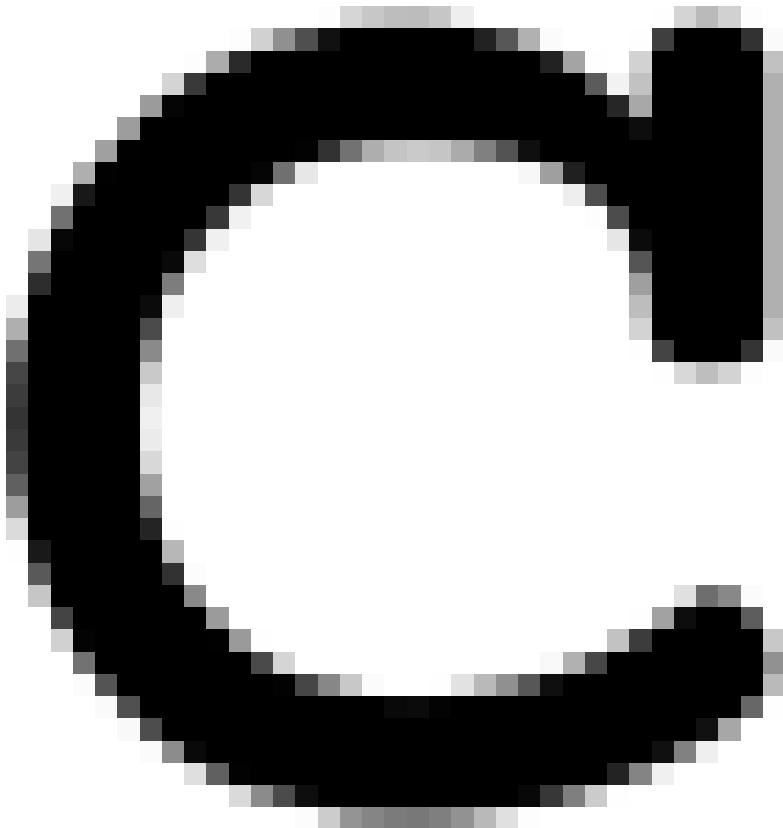


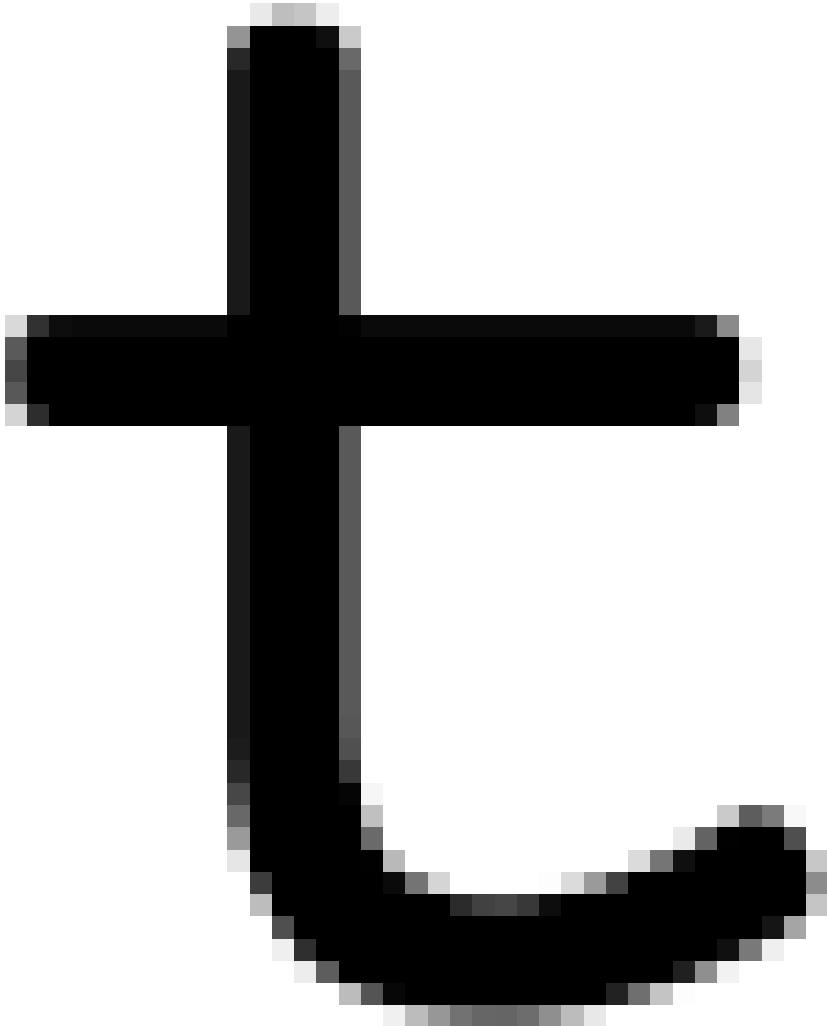


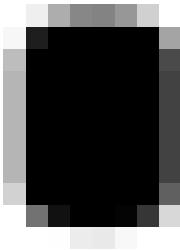




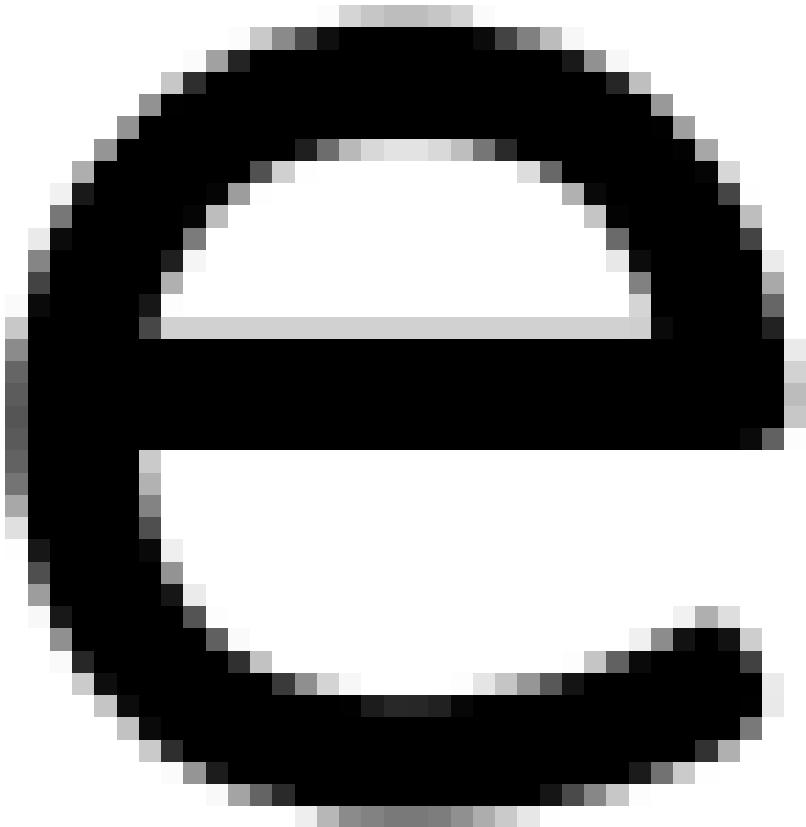






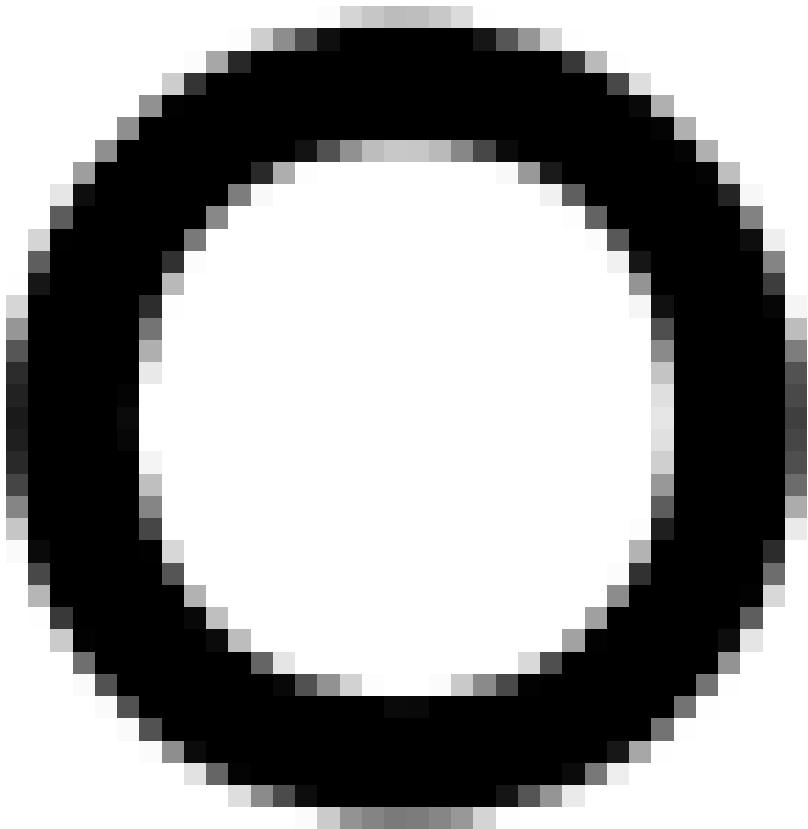


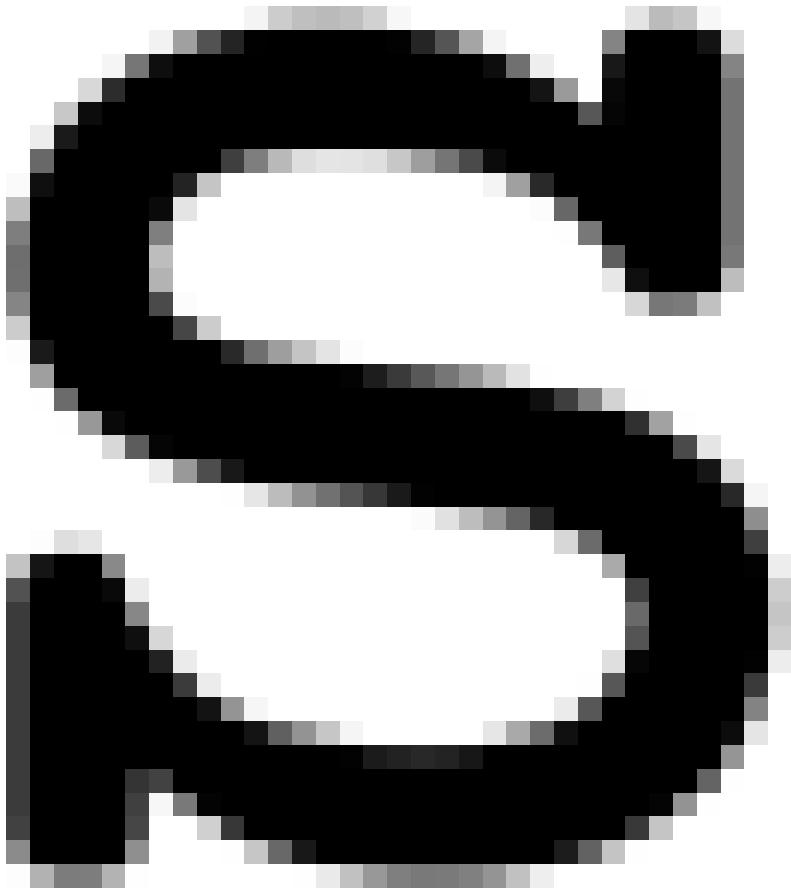


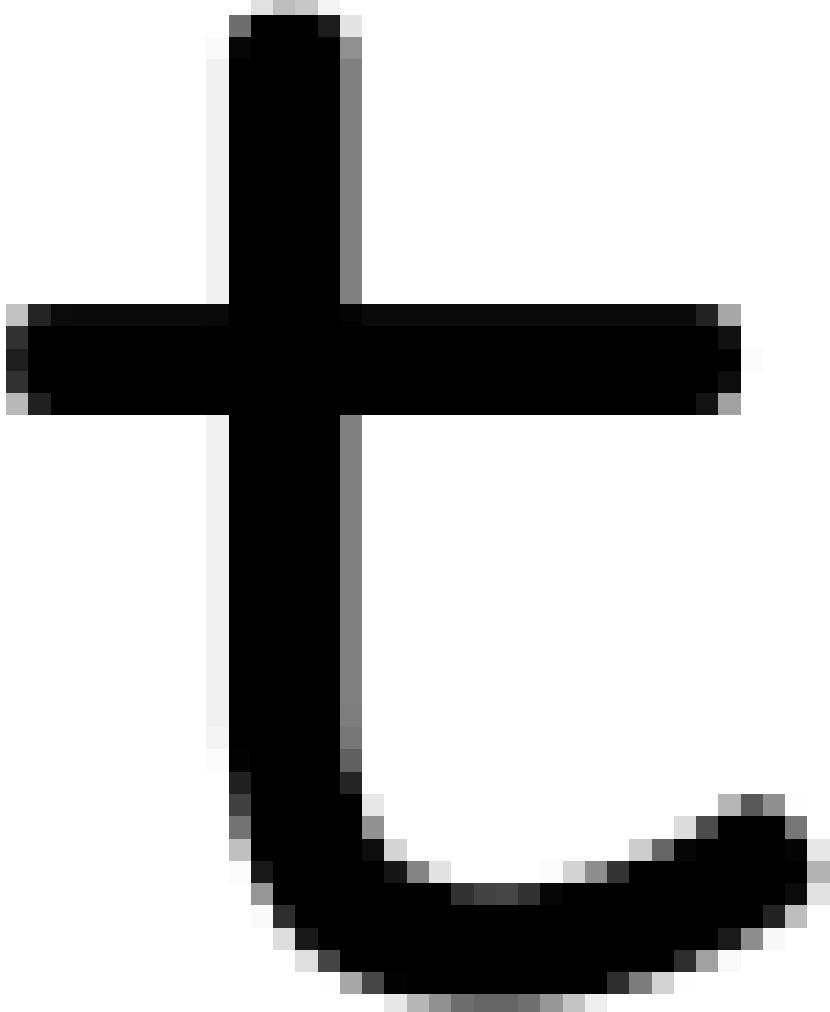


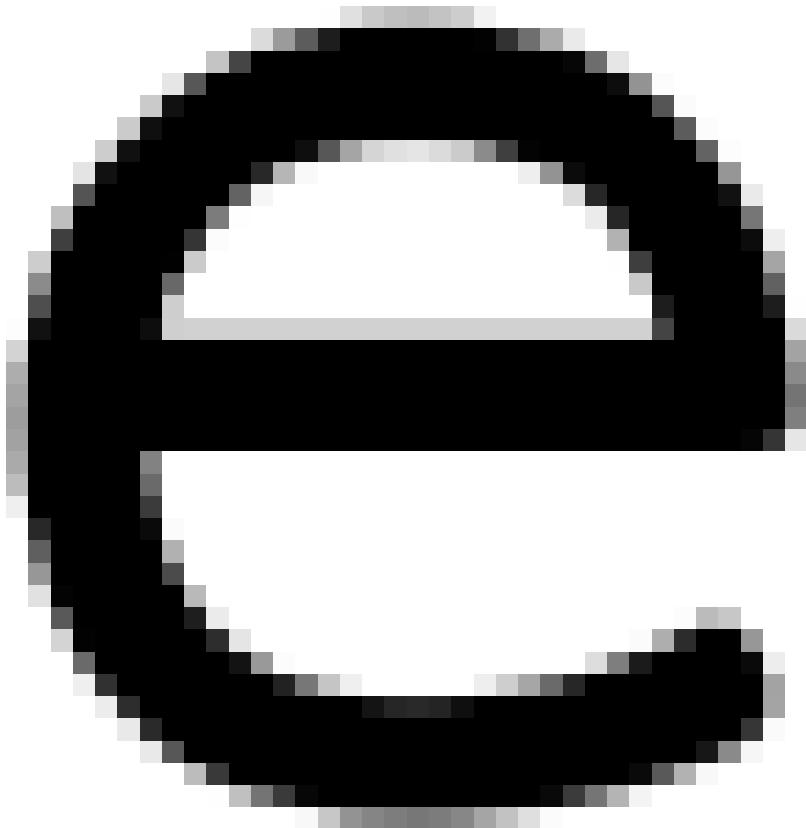




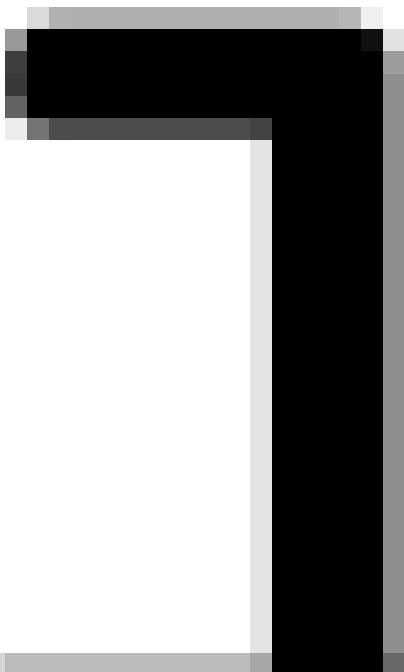
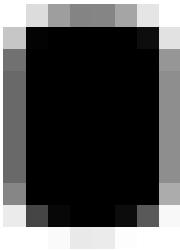


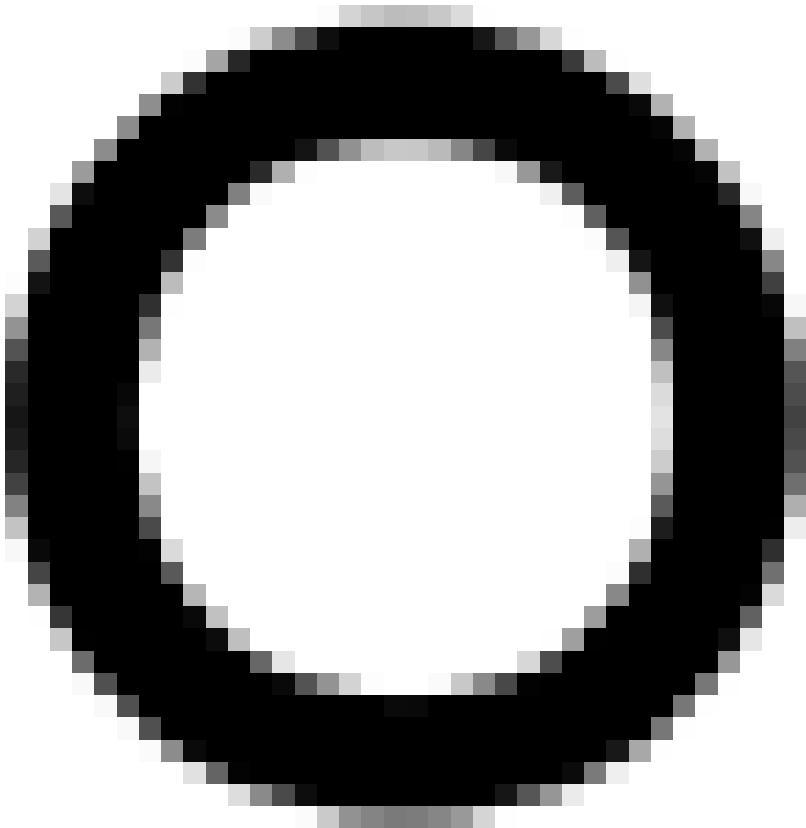


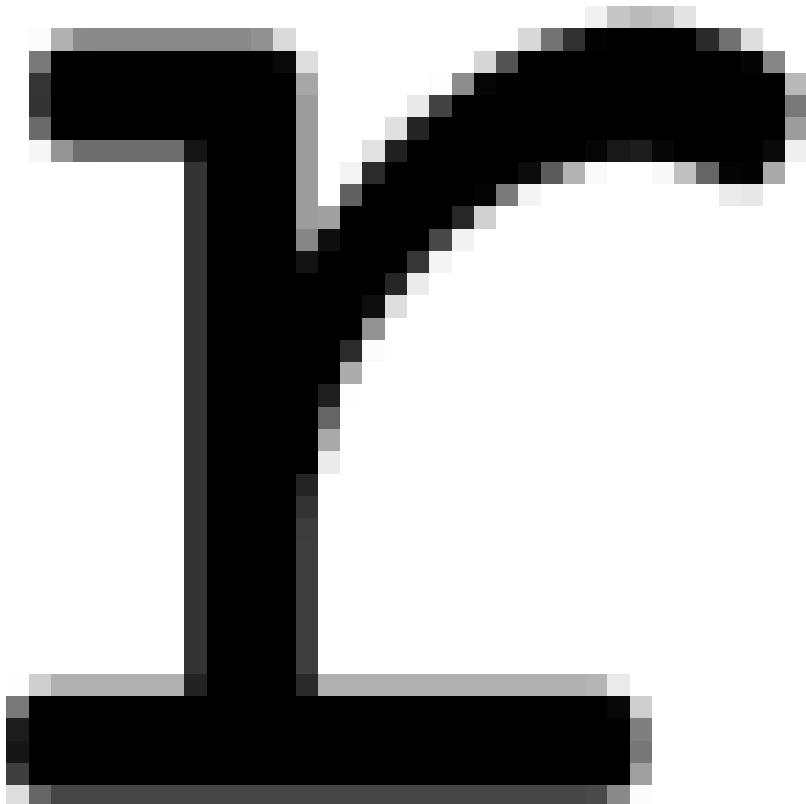












Insight: Updating the beliefs imply updating the semantics weights w_i , which in hand are updated using the previous slide!

Thm 3.

measurements (measurements)

the prediction parameters for the prediction

measures against pollution

posterior

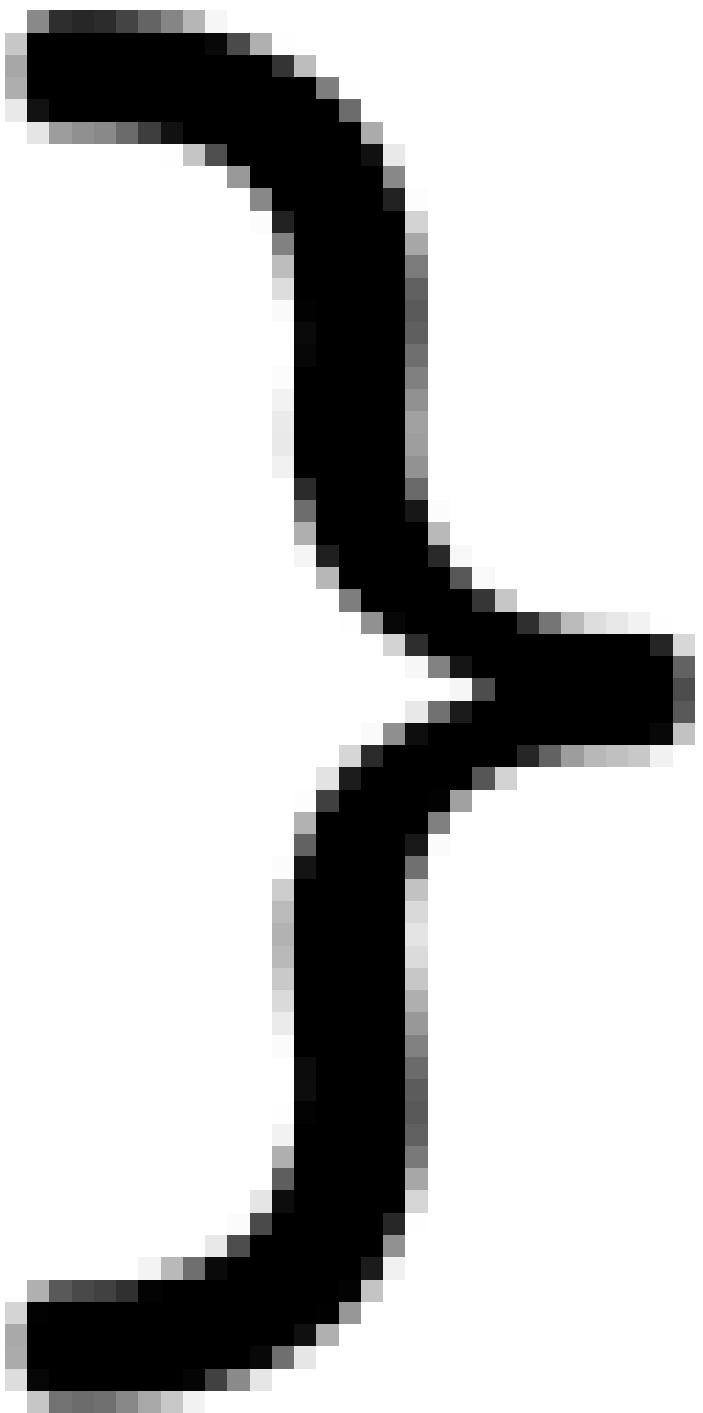
the postscript of the manuscript of the first edition of the *Principia* (1687) contains the following note:

the author has omitted the first part of the second section of the first chapter, which contained a demonstration of the law of gravitation, and has substituted another, more exact one.

$M_g(\theta)$ (posterior moments) = $E[g(\theta)]$

missions moments

p(θ) \propto $\text{posterior}(\theta)$ \propto $\text{prior}(\theta) \cdot p(\text{data} | \theta)$



gaussian mixture model prediction

reducir la operación a posiciones de estacionamiento

Physical conjugate(?) prior

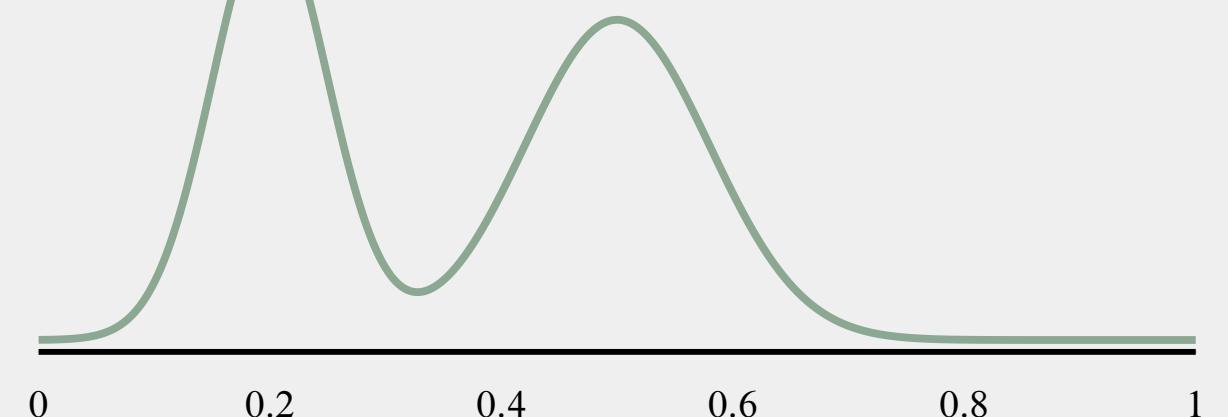
DIRICHLET NORMAL-INVERSE-GAMMA

$$p(\Theta | \Psi) = \text{Dir}(\mathbf{w} | \mathbf{a}) \cdot \prod_{i=1}^k \mathcal{N}\Gamma^{-1}(\mu_i, \sigma_i^2 | \tau_i, \kappa_i, \beta_i, \gamma_i)$$

$\mathcal{N}\Gamma^{-1}$ is a conjugate prior for \mathcal{N} with unknown mean and variance.

GAUSSIAN MIXTURE

$$p(\psi | \Theta) = \sum_{i=1}^k w_i \mathcal{N}(\psi | \mu_i, \sigma_i^2)$$



POSTERIOR (???)

$$p(\Theta | \psi, \Psi) = \frac{1}{M} \left[\sum_{j=1}^k c_j \text{Dir}(\mathbf{w} | \tilde{\gamma}_j) \cdot \mathcal{N}\Gamma^{-1}(\mu_j, \sigma_j^2 | \tilde{\tau}_j, \tilde{\kappa}_j, \tilde{\beta}_j, \tilde{\gamma}_j) \cdot \prod_{i \neq j}^k \mathcal{N}\Gamma^{-1}(\mu_i, \sigma_i^2 | \tau_i, \kappa_i, \beta_i, \gamma_i) \right]$$

Thm 3.

```
funct moments(measurements) {
    Array moments_hist = [] \\ Parameters for the predictive post.
    for ψ in measurements do {
        posterior = p(θ|ψ, Ψ)
        \\ Calculate sufficient moments of the posterior
        Array moments = E[g_j(θ)] = M_{g_j(θ)}(posterior)
        moments_hist.push(moments)
        approx_post = p(moments|θ) \\ Approximate posterior as DNIG
    }
    predictive_posterior = p(ψ| E[moments_hist]) \\ Gaussian mixture
    return approx_post, predictive_posterior
}
```

Insight: Updating the beliefs imply updating the semantics weights w_i , which in hand are updated using the previous slide!

The Big Picture