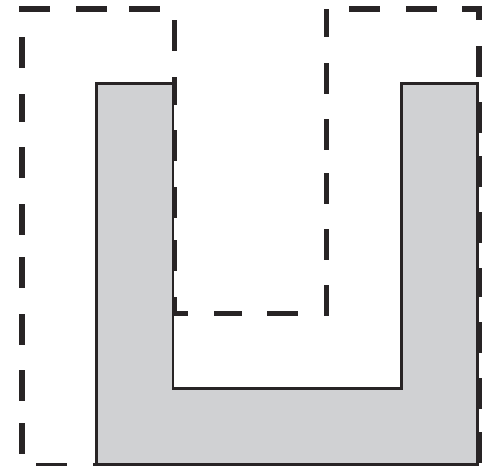
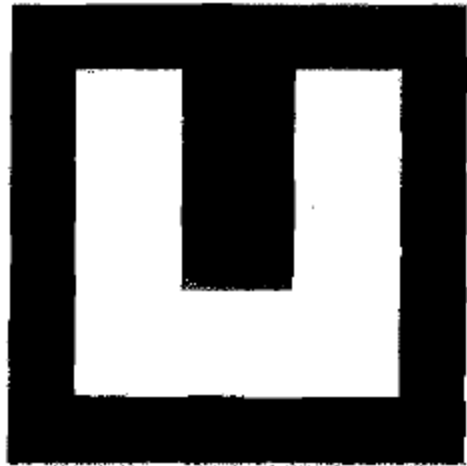


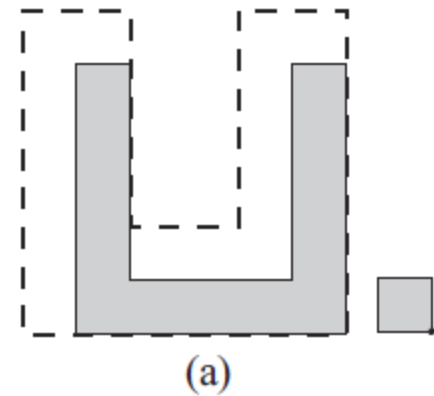
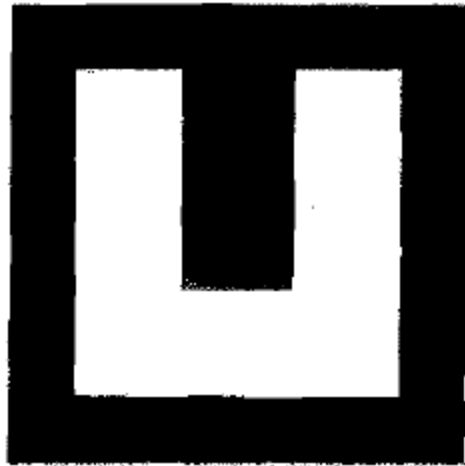
Some Example Problems

With reference to the image shown, give the structuring element and morphological operation(s) that produced each of the results shown in images (a) through (d). Show the origin of each structuring element clearly. The dashed lines show the boundary of the original set and are included only for reference. Note that in (d) all corners are rounded.



(a)

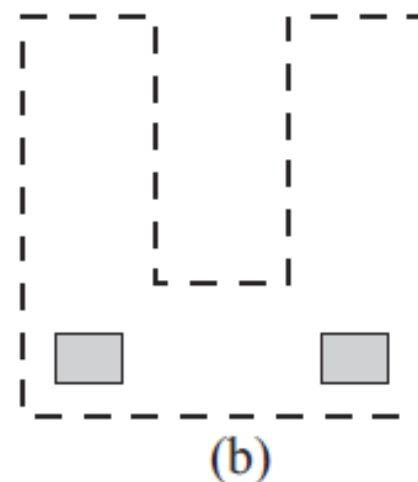
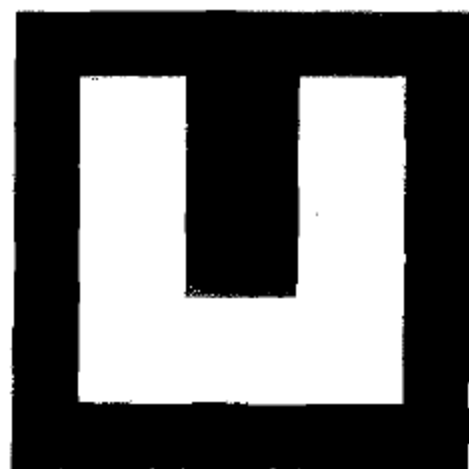
With reference to the image shown, give the structuring element and morphological operation(s) that produced each of the results shown in images (a) through (d). Show the origin of each structuring element clearly. The dashed lines show the boundary of the original set and are included only for reference. Note that in (d) all corners are rounded.



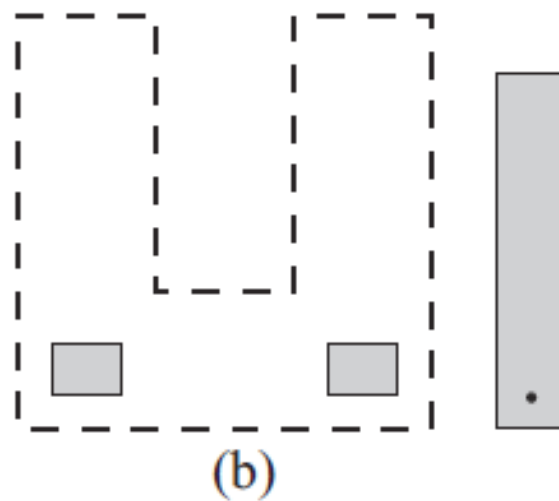
Refer to Fig. P9.5. The center of each structuring element is shown as a black dot.

(a) This solution was obtained by eroding the original set (shown dashed) with the structuring element shown (note that the origin is at the bottom, right).

With reference to the image shown, give the structuring element and morphological operation(s) that produced each of the results shown in images (a) through (d). Show the origin of each structuring element clearly. The dashed lines show the boundary of the original set and are included only for reference. Note that in (d) all corners are rounded.

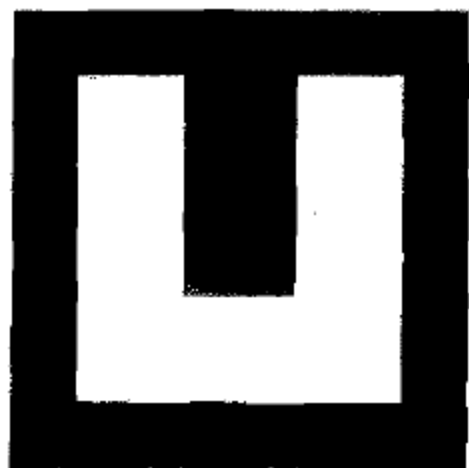


With reference to the image shown, give the structuring element and morphological operation(s) that produced each of the results shown in images (a) through (d). Show the origin of each structuring element clearly. The dashed lines show the boundary of the original set and are included only for reference. Note that in (d) all corners are rounded.

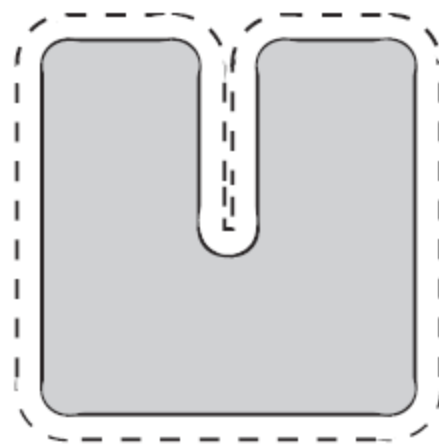


(b) This solution was obtained by eroding the original set with the tall rectangular structuring element shown.

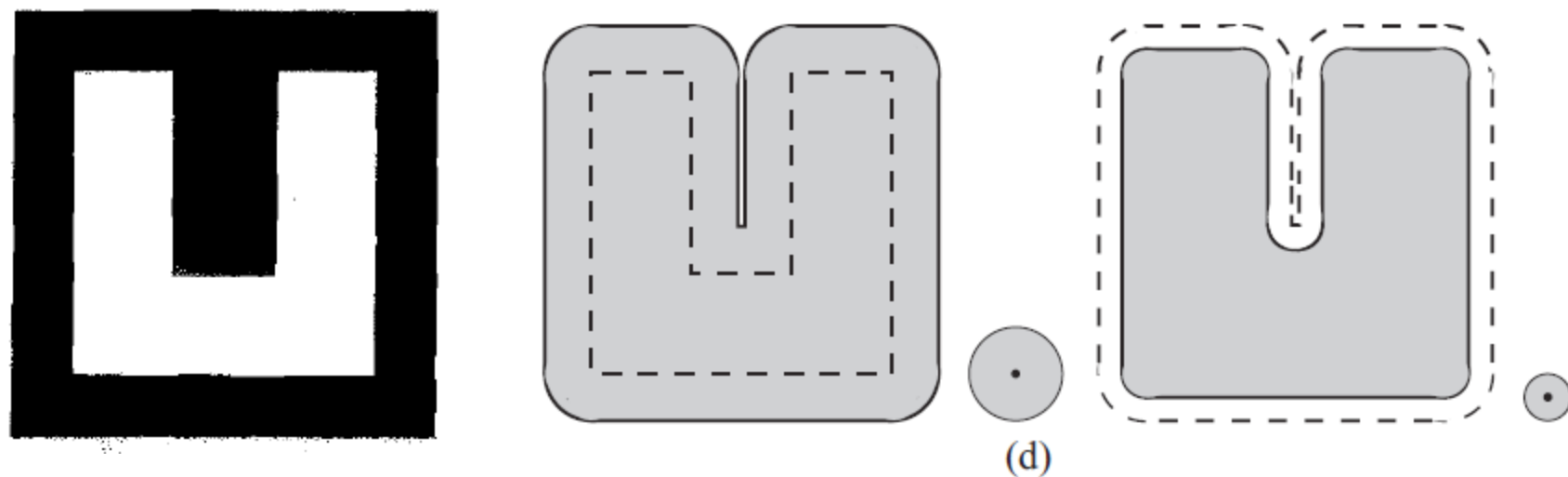
With reference to the image shown, give the structuring element and morphological operation(s) that produced each of the results shown in images (a) through (d). Show the origin of each structuring element clearly. The dashed lines show the boundary of the original set and are included only for reference. Note that in (d) all corners are rounded.



(d)



With reference to the image shown, give the structuring element and morphological operation(s) that produced each of the results shown in images (a) through (d). Show the origin of each structuring element clearly. The dashed lines show the boundary of the original set and are included only for reference. Note that in (d) all corners are rounded.



(d) This solution was obtained by first dilating the original set with the large disk shown. The dilated image was eroded with a disk whose diameter was equal to one-half the diameter of the disk used for dilation.

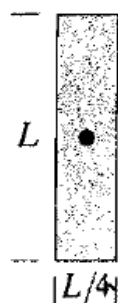
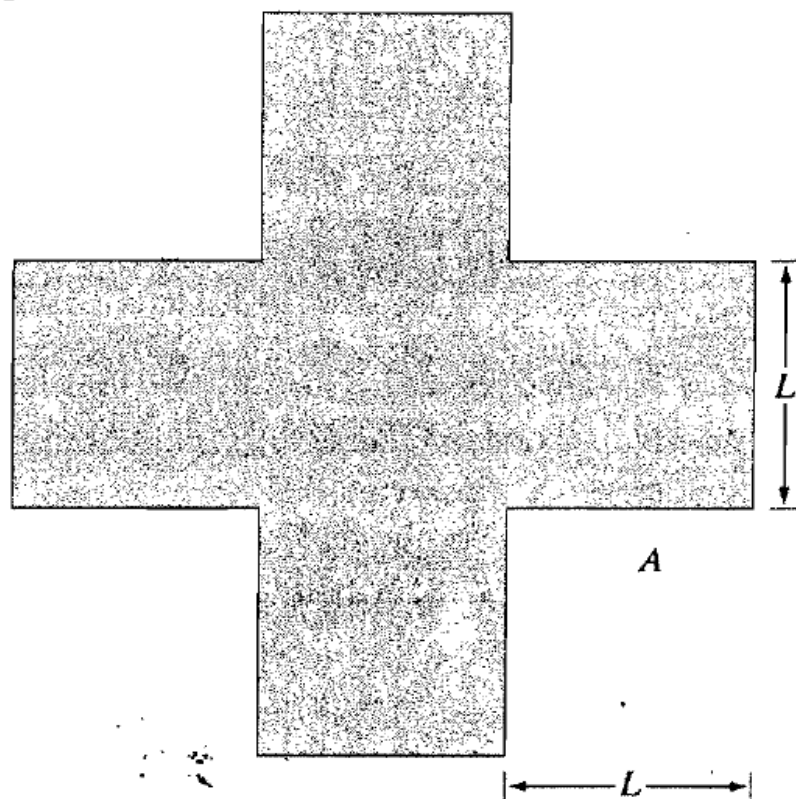
9.6 Let A denote the set shown shaded in the following figure. Refer to the structuring elements shown (the black dots denote the origin). Sketch the result of the following morphological operations:

(a) $(A \ominus B^2) \oplus B^4$

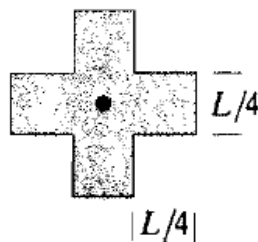
(b) $(A \ominus B^1) \oplus B^3$

(c) $(A \ominus B^3) \oplus B^1$

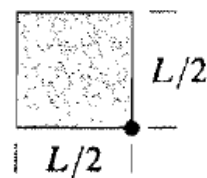
(d) $(A \oplus B^3) \ominus B^2$



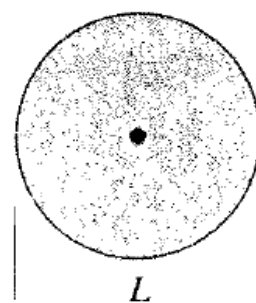
B^1



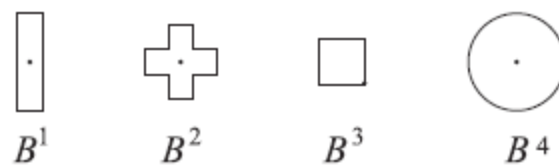
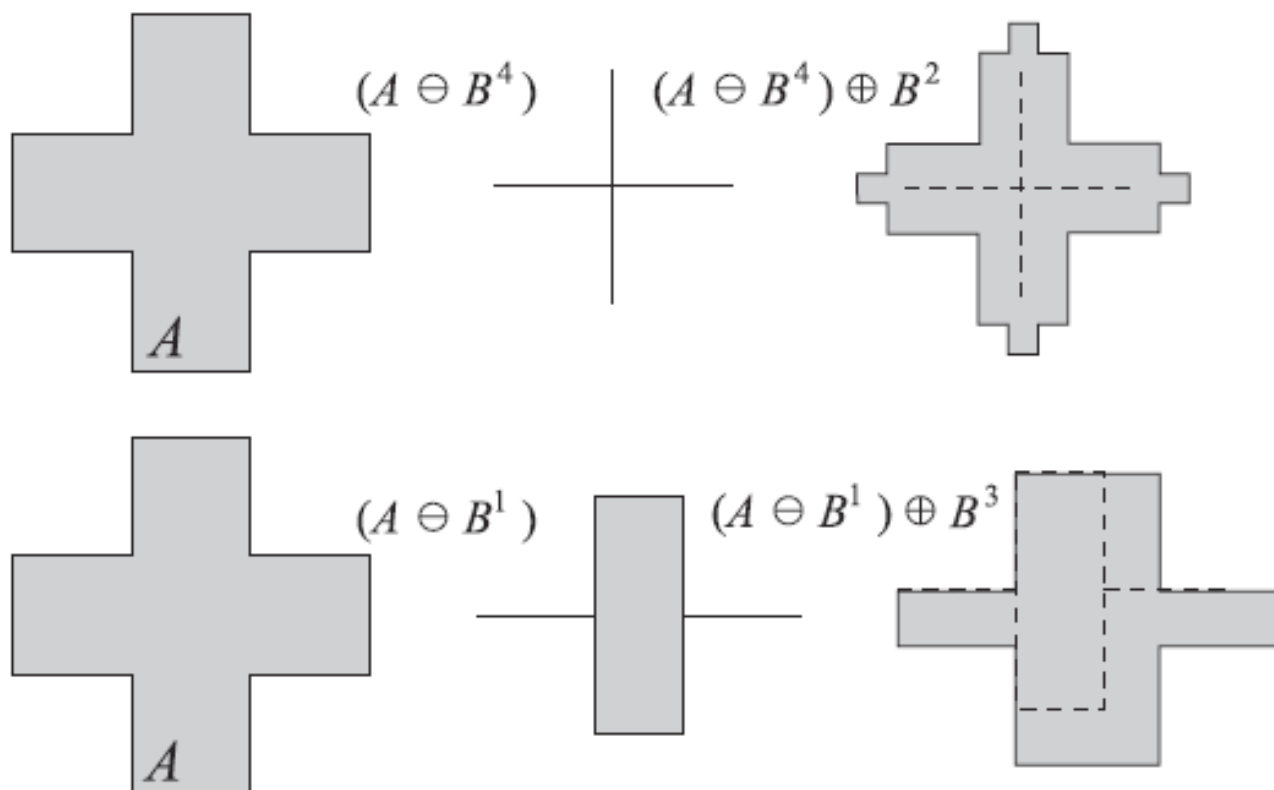
B^2

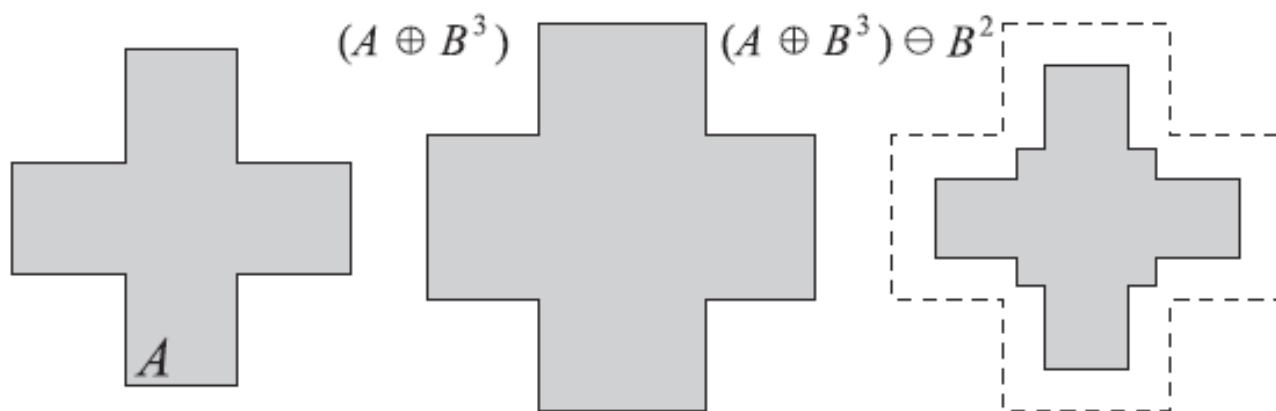
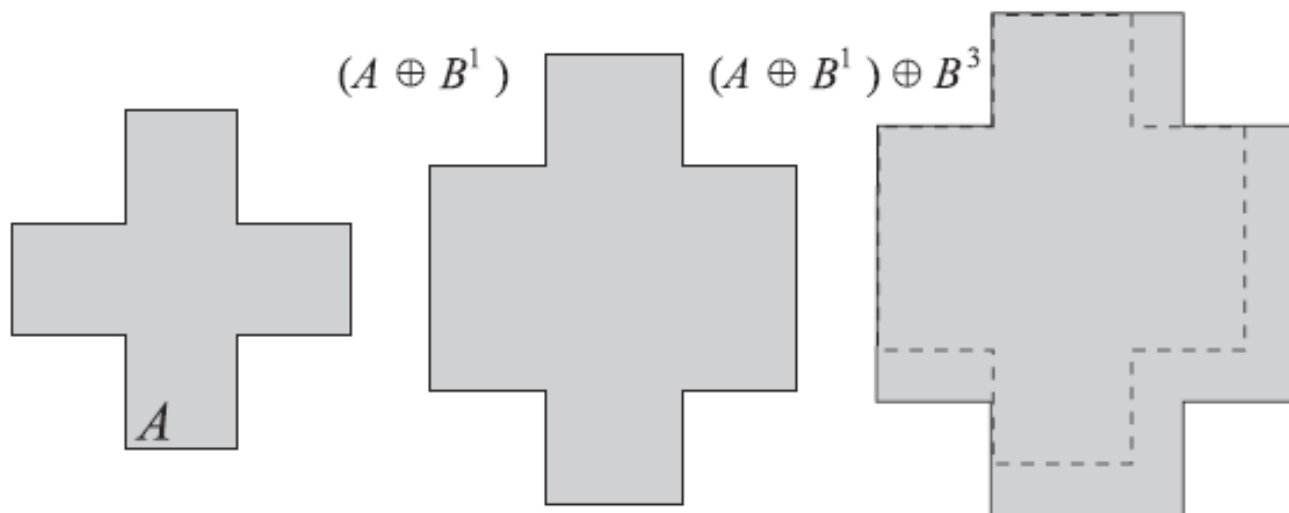


B^3



B^4





B^1



B^2



B^3



B^4