**Multiple Choice**

1. **Given:**

Img = imread(‘CS1371.jpg’)

Which of the following statements maximizes the blue color of the image?

A. Img(:,:,1) = 255;

B. Img(:,:,2) = 255;

C. Img(:,:,3) = 255;

D. Img(:,:,2) = 0;

E. Img(:,:,3) = 0;

**Answer: C**

2. **Given:**

Pic = imread(‘picture.jpg’);

Pic(: , : , 1) = 0;

What will the code do?

A. Eliminate all of the red in Pic

B. Eliminate all of the green in Pic

C. Increase all of the green in Pic

D. Increase all of the red in Pic

E. None of the above

**Answer: A**

3. **Given:**

Pic = imread(‘picture.jpg’);

X = class(Pic)

What is X?

A. array

B. mat

C. img

D. double

E. None of the above

**Answer: E (answer is uint8)**

4. You have 7 colored cards – orange(O)=6, blue(B)=3, green(G)=4, yellow(Y)=5, violet(V)=1, red(R)=7 and indigo(I)=2 You have to arrange these cards in an order to satisfy the concept of VIBGYOR (arrangement of colors in a rainbow). In an attempt to put the cards in numerical order, you pick up the first card at random and place it on the table. You then pick up another card, compare it to the card on the table, and then place it in the proper order. You repeat this process with all the cards comparing them one at a time to the ordered cards on the table.

What kind of sorting algorithm have you just performed?

A. Quick Sort

B. Merge Sort

C. Insertion Sort

D. Bubble Sort

E. Selection Sort

**Answer: C**

5. **Fill in the blanks (in order):**

Insertion Sort has a Big O of \_\_\_\_\_\_, Bubble Sort has a Big O of \_\_\_\_\_\_\_.

A. n2 , n2

B. n\*log(n), n2

C. n2 , n\*log(n)

D. n\*log(n), n\*log(n)

E. None of the above.

**Answer: A**

6. If you had a vector of X values and their corresponding y values, how would you find the derivative?

A. diff(x)./diff(y)

B. diff(y)

C. diff(y)/diff(x)

D. diff(y)./diff(x)

E. None of the Above

**Answer: D**

7. Which of the following returns an error with x = 1:10

A. y1 = spline(x,y,20)

B. y1 = interp1(x,y,5, 'spline')

C. y1 = interp1(x,y,15, 'linear')

D. y1 = interp1(x,y, 8, 'cubic')

E. All of the Above

**Answer: C**

8.  **Given:**

[S fs] = wavread('sound.wav');

Which of the following would not play the sound back at twice the pitch?

1. sound(S(round(linspace(1,length(S),length(S)/2))),fs)
2. sound(S(1:4:end),fs./2)
3. sound(S(1:2:end),2.\*fs)
4. sound(0.5.\*S,2.\*fs)
5. None of the above

**Answer: C**

9. Sound vectors S1 and S2 are the same length. Which of the following will play the two at same time?

I. sound([S1 S2],fs)

II. sound([S1; S2], fs)

III. sound(S1+S2,fs)

1. I only
2. II and III
3. III only
4. I and III
5. I, II, and III

**Answer: D**

10. Which of the following sets of data is likely to have a runtime close to O(n2) using Quick Sort with the first value as the initial pivot?

I. [0 2 5 4 6 8 22 85]

II. [0 82 96 43 58 4 -7 73]

III. [72 42 13 12 8 6 3 -7]

A. II only

B. I and II only

C. I and III only

D. II and III only

E. I, II, and III

**Answer: C**

**Tracing**

**1. Given the Following Function**

function plotCurve(newx,mat,shapes)

hold on

trow = size(mat);

for i=1:trow(1)

yval = polyval(mat(i,:),newx);

plot(newx,yval,shapes(end+1-i))

end

What will the plot of plotCurve(1:3,[1 0 1 -2;0 1 5 2], 'to\*') look like?

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**2.**

**A.** Sort vector [5 2 7 9 3 1] by using bubble sort. You must show the result after every pass. Do not show internal swaps.

**Answer:**

1. [2 5 7 3 1 9]
2. [2 5 3 1 7 9]
3. [2 3 1 5 7 9]
4. [2 1 3 5 7 9]
5. [1 2 3 5 7 9]

**B.** What is the Big O of this algorithm and what does it mean?

**Answer: N2 BigO notation essentially describes how efficient an algorithm is by presenting how a given function grows in complexity as n becomes larger and larger.**

**III. Coding**

1. **Raise a sound vector C at middle C to D and lower volume to half. Store in NewD**

**Answer:**

**NewD = C(round(linspace(1,length(C), length(C)./(2^2./12)))./2**

1. **Flip green horizontally and swap blue and red in image matrix Ima. Flip Vertically and store in NewIma.**

**Answer:**

**Ima(:,:,2) = Ima(:,end:-1:1,2);**

**NewIma = Ima(end:-1:1,:,3:-1:1);**

1. **Give the coefficients of the derivate and integral of coefficients vector coeff. Assume initial point is [0,0]. Store in deriv and integ respectively.**

**Answer:**

**deriv = coeff(1:end-1).\* length(coeff):-1:1**

**integ = [coeff 0] ./[length(coeff):-1:1 1]**

1. **Find the derivative of points vectors x and y. Store in dydx and plot vs x.**

**Answer:**

**dydx = diff(y)./diff(x)**

**plot(x(2:end),dydx)**