There are 25 single choice questions. Each one is worth 4 points. The total score for the exam is 100.

Answer the questions on the bubble sheet given.

Fill in the **Instructor**, **Course**, **Signature**, **Test**, and **Date** blanks in the bubble sheet. For “Instructor” put your **RECITATION INSTRUCTOR’S LAST NAME** given in the table below. For “Course” put CS 177. For “Test/Quiz” put 01.

Fill in the bubbles that correspond to your name, section and Student ID in the bubble sheet. For your section number, use the **SECTION NUMBER** of your recitation section. Consult the following list:

<table>
<thead>
<tr>
<th>Sec</th>
<th>Rec Time</th>
<th>Rec Room</th>
<th>Rec Instructor</th>
</tr>
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<tbody>
<tr>
<td>001</td>
<td>WED 08:30</td>
<td>BRNG 1242</td>
<td>Kazi Mohammad</td>
</tr>
<tr>
<td>002</td>
<td>WED 09:30</td>
<td>LWSN 1106</td>
<td>Ruby Tahboub</td>
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<td>003</td>
<td>WED 10:30</td>
<td>LWSN 1106</td>
<td>Jin Yu</td>
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<td>004</td>
<td>WED 11:30</td>
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<td>Gnana Kiruba Surendra Kumar</td>
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<td>005</td>
<td>WED 14:30</td>
<td>LWSN 1106</td>
<td>Uzunbaz Serkan</td>
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<td>006</td>
<td>FR 07:30</td>
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<td>008</td>
<td>FR 11:30</td>
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<td>Gnana Kiruba Surendra Kumar</td>
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<td>009</td>
<td>FR 13:30</td>
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<td>011</td>
<td>FR 16:30</td>
<td>HAAS G066</td>
<td>Uzunbaz Serkan</td>
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For your student ID, use the 10 digit ID number on your student ID card. **DO NOT USE YOUR SOCIAL SECURITY NUMBER!**

**Exams without names will be graded as zero.** Only the answers on the bubble sheet will be counted. The questions will be discarded.

**Remember to fill in also the fields on page 2.**
Q1. The activity of converting data or information into some symbol is called:

A) Recipe  
B) Encoding  
C) Decoding  
D) Algorithm

Q2. The Central Processing Unit (CPU) does all the following except....

A) Fetches instructions and data from memory  
B) Performs computations on the data based on the instructions  
C) Stores large quantities of data  
D) Sends results to output devices

Q3. Consider the following function definition:

```python
def sum(a, b):
    c = a + b
    return c
print "Hello World"
```

What is the output when you execute `sum(4,5)` from the command window in JES?

A) 9  
B) Hello World  
C) 9  
   Hello World  
D) There is no output
Q4. Consider the following three commands:
   (i) print range(10)
   (ii) print range(10, 0)
   (iii) print range(0, 10, 1)

Which of the above functions produce the same output?
A) (i) and (iii) only
B) (i) and (ii) only
C) (ii) and (iii) only
D) All the above functions produce the same output.

Q5. How many times does the following code print “CS177”?

   for i in range(0, 5):
       for j in range(4):
           print “CS177”
   print “CS177”

A) 20 times
B) 21 times
C) 30 times
D) 31 times

Q6. Which of the following statements about the function range is FALSE?

A) range(0, 1) generates the sequence [0]
B) range(1, 4, 2) produces the same sequence of range (1, 5, 2)
C) it accepts up to three parameters
D) range(10, 1, -1) generates the sequence [10, 9, 8, 7, 6, 5, 4, 3, 2, 1]
Q7. Consider the two images below:

Consider that the canvas image was empty initially. For each coordinate source\textsubscript{x}, source\textsubscript{y} of the source image, you copied the pixel at that location to the coordinate target\textsubscript{x}, target\textsubscript{y} of the target image. Which is the relation that holds true among source\textsubscript{x}, source\textsubscript{y}, target\textsubscript{x} and target\textsubscript{y} when doing the above copying?

- A) target\textsubscript{x} = source\textsubscript{x} + 3 and target\textsubscript{y} = source\textsubscript{y} + 1
- B) target\textsubscript{x} = source\textsubscript{x} + 2 and target\textsubscript{y} = source\textsubscript{y} + 2
- C) target\textsubscript{x} = source\textsubscript{x} + 1 and target\textsubscript{y} = source\textsubscript{y} + 1
- D) target\textsubscript{x} = source\textsubscript{x} + 1 and target\textsubscript{y} = source\textsubscript{y} + 3

Q8. The makeLighter() function is applied to all pixels in a picture in an effort to make it lighter. On examining a pixel, whose RGB values were 140, 177 and 129 respectively before applying makeLighter(), what is the likely set of RGB values you would expect to find after makeLighter() was applied?

- A) R: 100 G: 150 B: 90
- B) R: 100 G: 220 B: 160
- C) R: 175 G: 150 B: 160
- D) R: 175 G: 220 B: 160
Q9. Consider that the numbers from 1 to 20 are arranged in a two dimensional matrix with 4 rows and 5 columns, filling one row after the other. What are the co-ordinates for the number 14 within the matrix?

A) (3, 2)  
B) (3, 4)  
C) (2, 3)  
D) (4, 3)

Q10. What is the result of the following function?

def function(picture):
    for pixel in getPixels(picture):
        setRed(pixel, 0)
        setBlue(pixel, 0)
        setGreen(pixel, 0)

A) The last pixel turns black.  
B) The whole picture turns black.  
C) The whole picture turns white.  
D) The program causes a run-time error.

Q11. Assume that we have a picture with width of 300 and height of 50. We want to write a program that scales the picture up by a factor of 4 and then rotates the picture to the left by 90 degrees. Which of the following statements should we use to make the empty picture that will be used by our program?

A) newPicture = makeEmptyPicture(200, 1200)  
B) newPicture = makeEmptyPicture(1200, 200)  
C) newPicture = makeEmptyPicture(300, 200)  
D) newPicture = makeEmptyPicture(300, 50)
Q12. Assume that you met a color-blind person who sees the red color as green and the blue color as yellow. You wondered the way he sees the pictures and decided to write a program that modifies a picture as if you are color-blind like him. Your function should take the picture as parameter, set the red colored pixels to green and the blue colored pixels to yellow. The function should show the updated picture.

Which of the following functions has the required effect?

A. def beColorBlind(picture):
   for p in getPixels(picture):
      if getColor(p) == red:
         setColor(p, green)
      if getColor(p) == blue:
         setColor(p, yellow)
   show(picture)

B. def beColorBlind(picture):
   for p in getPixels(picture):
      if getColor(p) == red:
         setColor(p, green)
      else:
         setColor(p, yellow)
   show(picture)

C. def beColorBlind(picture):
   for p in getPixels(picture):
      setColor(red, green)
      setColor(blue, yellow)
   show(picture)

D. def beColorBlind(picture):
   for p in getPixels(picture):
      color = red
      setColor(p, green)
      color = blue
      setColor(p, yellow)
   show(picture)
Q13. Assume that we have a function \( \text{max}(a, b, c, d) \) that returns the maximum of the given parameters. Which of the following is \textbf{NOT} a legal statement?

A) \( \text{value} = \text{max}(7, 5, 11, 9) + 10 \)
B) \( \text{print} \ \text{max}(1, 3, 2, 4) \)
C) \( \text{max}(11, 17, 13, 15) \)
D) \( \text{result} = \text{max}(4, 2, 3) \)

Q14. Consider the following function:

```python
def meet(name, age):
    if (name == "ALICE"):
        if (age >= 40):
            print "Great!"
        else:
            print "Perfect!"
    else:
        print "Wonderful!"
```

What does the function print if we call it by `meet("ALICE", 40)`?

A) Great!
B) Perfect!
C) Wonderful!
D) The function gives an error.

Q15. Consider the function `meet(name, age)` of question Q14. If you want to get the output \textit{Perfect!} from the function, how should you call it?

A) `meet("BOB", 30)`
B) `meet("ALICE", 30)`
C) `meet("BOB", 40)`
D) `meet("ALICE", 50)`
Q16. Consider the following function:

```python
def EX1func1(a,b,c):
    print a
    list1 = range(1,3)
    var = 0
    for x in list1:
        print b
        var = var +1
    print c
    print var
```

If you call `EX1func1("ME", "YOU", "cat")` from the JES command window, which of the following statements is **FALSE**?

A) it prints the string “YOU” twice
B) it prints the string “cat” once
C) it prints the number 2
D) it prints the string “ME” twice
Q17. Consider the following function:

```python
def func2(a,b,c):
    print a
    list1 = range(1,3)
    var = 0
    for x in list1:
        print b
        var = var +1
    print c
```

If you call `func2("ME", "YOU", "cat")` from the JES command window, followed by the command `print var`, which of the following statements is TRUE?

A) the command `print var` will print 2
B) the command `print var` will print 0
C) the command `print var` will result in an error because the variable `var` is known only during the execution of the function `func2`
D) the command `print var` will print `[]`

Q18. Which of the following statement about Luminance is FALSE?

A) Luminance is the amount of light emitted by a given light source
B) Luminance is our perception of the amount of light emitted by a given light source
C) Luminance does not depend on the color
D) Luminance allows us to perceive the borders of things

Q19. Which of the following command results in a JES error?

A) `print "Mark" + "Mark"`
B) `print "Mark" + 2`
C) `print "MarkMark"`
D) `print "Mark" * 2`
Q20. Which of the following statements about vector-based graphical representation is **TRUE**?

A) Vector-based graphical representations store individual pixels or representations of those pixels.
B) Vector-based representations can be larger than bit-mapped representations
C) To change a vector-based graphical representation, you need to directly modify the individual pixels
D) Vector-based graphical representations are basically executable programs

Q21. Which of the following statements about the negative of a picture is **TRUE**?

A) To create a negative of a picture, you need to set the BLUE component of each pixel to 0
B) To create a negative of a picture, you need to set the RED, GREEN, and BLUE components of each pixel to the same value
C) To create a negative of a picture, you need to set the RED, GREEN, and BLUE components of each pixel to the average of the previous RED, GREEN, and BLUE components’ values of the pixel
D) If you create the negative of a picture \( P \), and then create the negative of negative, then you get the original picture \( P \) again.

Q22. What does the function `myFunc(picture)` do?

```python
def myFunc(picture):
    for p in getPixels(picture):
        intensity = (getRed(p)+getGreen(p)+getBlue(p))/3
        setColor(p,makeColor(intensity,intensity,intensity))
```

A) It makes the picture lighter
B) It makes the picture darker
C) It transforms the picture in grayscale
D) It creates the negative of the picture
Q23. What of the following statements about the JES function `setColor` is the most accurate one?

A) It takes a pixel and a color as input parameters
B) It takes a pixel and a color as input parameters, and sets the pixel to the given color
C) It takes a picture and a color as input parameters, and sets all the pixels of the picture to the given color
D) It takes a picture and a color component (RED, GREEN, or BLUE) value as input parameters

Q24. Sometimes you want to draw on pictures, or add something to the pictures. Suppose you want to draw a line with the function `addLine(picture, x1, y1, x2, y2)`. Which one of the following item has the right description of this function?

A) draw a line from position (x1,y1) to (x2,y2)
B) draw a line from position (x1,x2) to (y1,y2)
C) draw a line from position (x1,y2) to (x2,y1)
D) draw a line from position (y1,y2) to (x1,x2)

Q25. Consider the following function:

```python
def myFunc(pict):
    allPixels = getPixels(pict)
    for p in allPixels:
        value = getRed(p)
        setRed(p, value*0.5)
```

What does `myFunc` function do?

A) it increases the RED component of all the pictures’ pixels
B) it increases the RED component of the last pixel of the picture
C) it decreases the RED component of all the pictures’ pixels
D) it decreases the RED component of the last pixel of the picture