The 9th Annual Newport News Computer Challenge

Thursday, February 18, 2010

Team Packet

Visual Basic Problems

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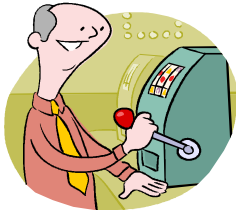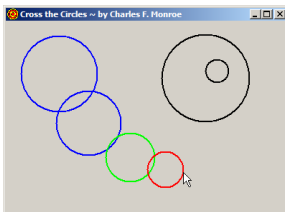
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Visual Basic Problems

Coffee or Tea ~ 10 points

Some Like It Hot! ~ 10 points

Slot Machine ~ 20 points

Cross the Circles ~ 30 points

Coffee Or Tea (10 points)

Create a project with a single form.

On the form, place a command button. When the command button is clicked, invoke a common dialog box to change the background color of the form. When the background color of the form changes, the background color of the buttons should not change. If the user cancels, no color change should occur.

Also on the form, create an additional command button which, when clicked, displays an Input Box that will ask the user if they would prefer coffee or tea. Set a default value of "Coffee", and position the Input Box in the upper left hand corner of the screen.

If the user responds correctly with either coffee or tea (case insensitive), a message should be displayed informing the user that their coffee (or tea, whichever they chose) will be ready in five minutes. If the user response is incorrect, the input box should be redisplayed. This process should continue until a correct response is obtained or the user cancels.

Some Like It Hot! (10 points)

All you science whizzes out there are probably familiar with the Kelvin temperature scale, named after the British mathematician and engineer William Thomson Kelvin, who proposed it in 1848.

The Kelvin temperature scale starts with 0 degrees at "absolute zero", the temperature at which molecular energy is at a minimum and below which no temperature exists. Kelvin degrees are the same size as Celsius degrees and 0 degrees Kelvin corresponds to -273.15 degrees Celsius, so that water freezes at 273.15 degrees Kelvin (0 degrees Celsius) and water boils at 373.15 degrees Kelvin (100 degrees Celsius).

But are you familiar with the Rankine temperature scale (named after the Scottish engineer and physicist William John Macquorn Rankine, who proposed it in 1859)? ("Rankine" is pronounced "RANK-in".)

The Rankine temperature scale begins with 0 degrees at "absolute zero" just like the Kelvin temperature scale, except that its degrees are the same size as Fahrenheit degrees. So 0 degrees Rankine corresponds to -459.67 degrees Fahrenheit, water freezes at 491.67 degrees Rankine (32 degrees Fahrenheit), and water boils at 671.67 degrees Rankine (212 degrees Fahrenheit).

Design a Visual Basic program that allows the user to type a Rankine temperature into a text box. When a button is clicked, the equivalent temperatures in Fahrenheit, Celsius, and Kelvin are displayed using one or more labels placed on the form.

Use the equivalencies provided in this problem to create your conversion formulas.

All calculated temperatures should be displayed rounded to the nearest one hundredth of a degree.

Your program should reject invalid input.

Information source: answer.com

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Slot Machine (20 points)

You are to design a slot machine. When the program starts, three blank images are displays. When the user clicks a button displaying the word "Roll", the program randomly selects and displays any combination of three images from a total of six images that you select*. A cumulative score is also displayed based on the rules below. Only selected images should be visible on your form.

One of the images (you decide) is the "loser". If that image appears, the player loses all money. (Be sure to indicate which image it is.)

Another of the images (you decide) is a "wild card". If that image appears, it can match with any other image except the "loser". (Be sure to indicate which image it is.)

Scoring is as follows:

```
loser is displayed – lose all money
2 matches – win $10 (unless loser is displayed)
3 matches – Jackpot! win $100 (can't be losers)
all else, roll again
```

* the six images have been placed in a folder named **nncc_slot_machine_pics** under **My Documents** on your computer to be used for this purpose. And additional image named "blank.jpg" is provided to be used when the program starts. The images (except the blank, which is invisible) look like this:
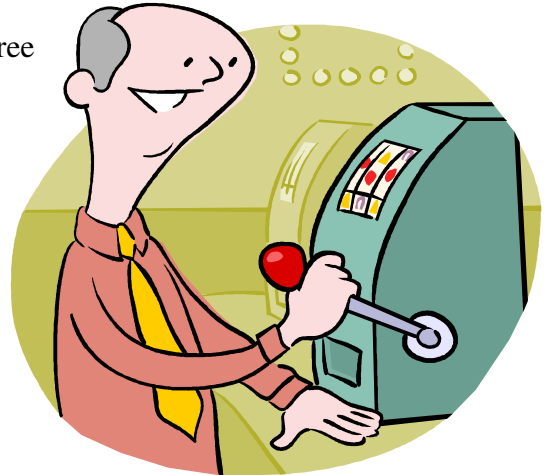
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Cross The Circles (30 points)
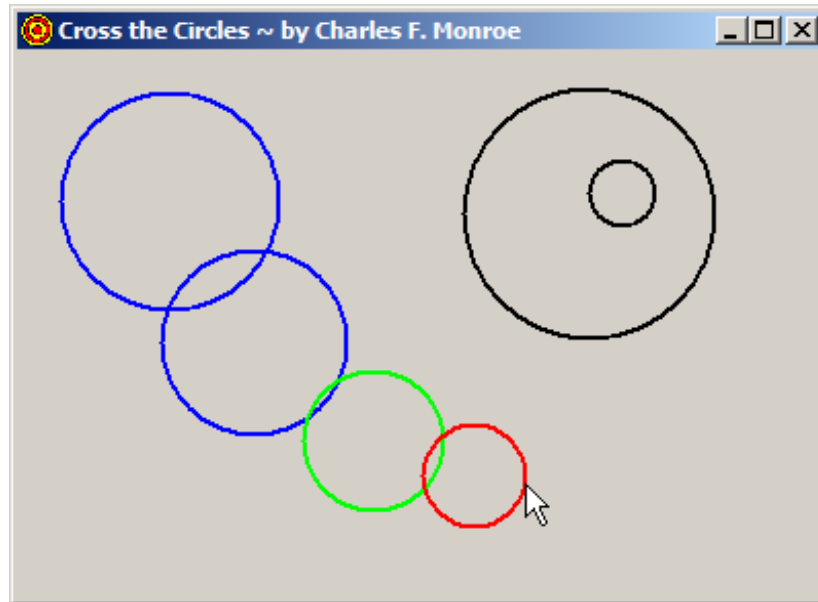
A blank form starts the program. Its caption contains both the name of the program and the author (team/school).

The user draws a series of circles on the form by left-clicking, dragging, and releasing. When the mouse goes down, that is the center of a circle. When the mouse comes back up, that is one point on the circle and the circle is immediately drawn.

If any two circles have at least one point in common, then we say the "cross" each other.

For each series of circles:
1) The first circle is drawn in black.
2) On each subsequent circle:
    a) If the newly drawn circle crosses any previously drawn circle, its color is red. Otherwise, it is black.
    b) All previously drawn circles crossed by the newly drawn circle turn green.
    c) All previously drawn green circles not crossed by the newly drawn circle turn blue (so black circles remain black until crossed).
3) Right-clicking anywhere on the form erases all circles and begins a new series of circles.

Visual Basic Ruberics for Teams

Coffee or Tea (10 points)

Title of problem and team's name are displayed.	1
Two command buttons with appropriate captions.	1
First button	
When clicked, a color common dialog box appears.	1
If Ok is clicked, the background of the form is correctly changed.	1
Second button	
When clicked, an Input Box asks for a preference of coffee or tea.	1
The default is set to "Coffee"	1
The position is in the uppert left hand corner of the screen.	1
The response for a correct message is correct.	2
Input repeats if the response is incorrect.	1
TOTAL	10

Some Like It Hot! (10 points)

Title of problem and team's name are displayed.	1
Input:	
Text box to type a Rankine temperature is correctly labeled.	1
Output:	
Rejects invalid input (negative values).	1
Correct Fahrenheit temperature.	2
Correct Celsius temperature.	2
Correct Kelvin temperature.	2
All 3 calculated temperatures are displayed rounded to the nearest one hundredth of a degree (appending zeros if needed).	1
TOTAL	10

Slot Machine (20 points)

Program displays 3 blank images at startup.	1
Roll button picks 3 random images, which are correctly displayed	3
Uses 6 non-blank images	1
Wild card image: specified=1, works=2	2
Loser image: specified=1, works=2	2
Detects & displays message (+1 each) • 2 of a kind, 3 of a kind, Loser (& loses all), all else roll again	4
Cumulative Score works (+1 each) • 2 of a kind, 3 of a kind, Loser (& loses all), all else roll again	4
Scoring rules are displayed	1
Clever code logic: • uses functions (2 points), uses nested ifs (1 point)	2
TOTAL	20

Cross The Circles (30 points)

A blank form starts the program. It has a non-default icon and its caption contains both the name of the program and the author (team/school).	5
The user draws a series of circles on the form by left-clicking, dragging, and releasing.	5
When the mouse goes down, that is the center of a circle. When the mouse comes back up, that is one point on the circle and the circle is immediately drawn.	5
The first circle (if drawn as above) is black.	5
Each subsequent circle:	
• If the newly drawn circle crosses any previously drawn circle, its color is red. Otherwise, it is black.	2
• All previously drawn circles crossed by the newly drawn circle turn green.	2
• All previously drawn segments CROSSED by the newly drawn segment turn GREEN.	2
• All previously drawn green circles not crossed by the newly drawn circle turn blue (so black circles remain black until crossed).	2
• Right-clicking anywhere on the form erases all circles and begins a new series of circles.	2
TOTAL	30