The 6th Annual Newport News Computer Challenge

Wednesday, February 28, 2007

Team Packet

Visual Basic Problems

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Visual Basic Problems

Coffee or Tea ~ 10 points

Some Like It Hot! ~ 10 points

The Chinese Animal Zodiac
Year Problem ~ 20 points

Make A Face ~ 30 points

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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.

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.

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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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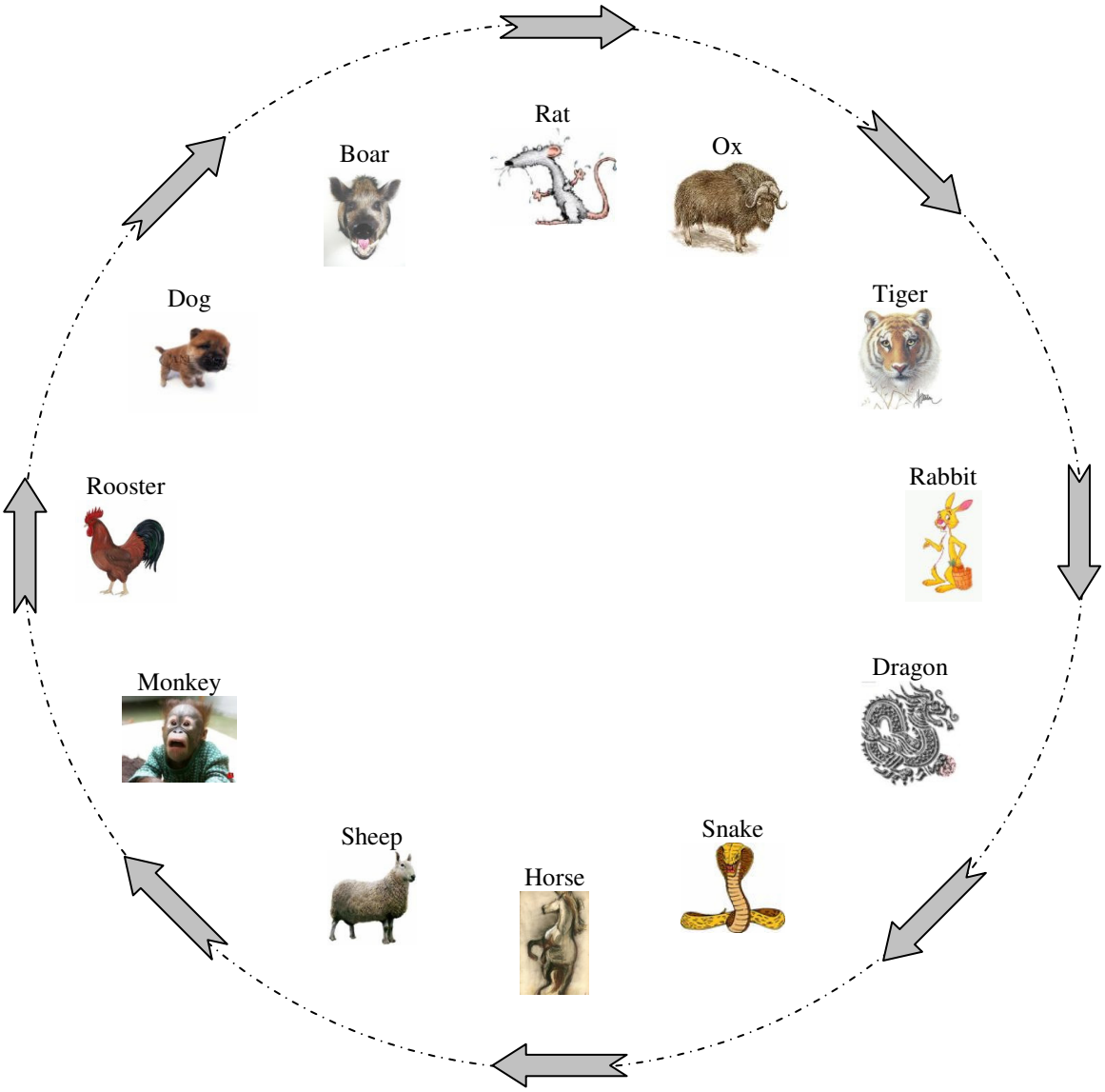
The Chinese Animal Zodiac Year Problem (20 points)

(15 points for the solution, 5 points for the images. See instructions for details.)

In the Chinese Animal Zodiac calendar, the years, for which we use numbers, are designated by twelve animals, beginning with the Rat:



Years are called "Year of the Rat", "Year of the Ox", etc.

When the "Year of the Boar" is reached, the next year is "Year of the Rat" again and the cycle repeats.

Although the Chinese New Year falls on different days yearly, somewhere between late January and early February based on the cycles of the moon, for the purposes of this problem, we will assume that Chinese Animal Zodiac years correspond exactly to years on our Western calendar (so years begin on January 1).

1996 was “The Year of the Rat”.

Design a Visual Basic program that allows the user to input a Western numerical year from 1500 to 2999 inclusive into a text box. When the user clicks a button labeled "Show Chinese Animal Zodiac Year", the appropriate Chinese Animal Zodiac Year is displayed in a label. If the year is out of range, display "Out of Range." Do not worry about other invalid input.

Samples

Western Year	*Chinese Animal Zodiac Year*
1500	The Year of the Monkey
2006	The Year of the Dog
2007	The Year of the Boar
2008	The Year of the Rat
2999	The Year of the Sheep
3000	Out of Range

To this point, if your program solves the problem correctly—correct design and layout, correct input of western year, correct calculation and display of Chinese Animal Zodiac year, and correct detection of out of range errors—you will receive up to 15 points.

If your program can correctly display the Chinese Animal Zodiac year given a western numerical year within the prescribed range, you are eligible for an additional 5 points (for a grand total of 20 points) by displaying the image of the appropriate animal next to your textual output. Twelve JPG images of the twelve animals of the Chinese Animal Zodiac have been placed in a folder named **nncc_pics** under **My Documents** on your computer to be used for this purpose. To get the 5 points, all twelve animal images must be displayed correctly. No partial credit.

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Make A Face (30 points)

The form contains, at minimum, a slider* with values from 50 to 200 and a drop-down combo box listing at least six colors. Labels appear appropriately. Visual Basic 6.0 programmers, set your form's ScaleMode property to "3- Pixel". (Visual Basic 2005 forms have no ScaleMode property and use pixels only.)

The user can select a value using the slider and a color using the drop-down combo box, then click anywhere on the form any number of times. Each time the user clicks on the form, a round smiley face with two eyes and mouth is drawn whose center is the place where the user clicked, whose radius is the value of the slider, and whose eye color is the color selected in the drop-down combo box. The face should have two circles for eyes (filled with the eye color) and a semicircle for a mouth. These three features should be placed and sized proportionally to the size of the circle.

We don't expect your faces to look nearly as good as the one pictured above.

** how to find a slider:*

In Visual Basic 6.0: *You have to add the slider to your toolbox. To do this, right-click on the toolbar and select "Components...". Under the Controls tab, scroll down to "Microsoft Windows Common Controls 6.0 (SP6)". Check the check box. Then click Close. You will then see a slider on your toolbox.*	*In Visual Basic 2005:* *The slider is called a TrackBar. You'll find it under "All Windows Forms" on your toolbox and it looks like this:* TrackBar

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Visual Basic – Ruberic For Teams

Coffee or Tea (10 points)

	Max 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)
Visual Basic - Ruberic

	Max 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

Chinese Animal Zodiac Year Problem (20 points)
Visual Basic - Ruberic

	Max Points
Program name and team name are displayed.	1
A text box to input Western numerical year is correctly labeled.	1
A button is labeled "Show Chinese Animal Zodiac Year".	1
The correct Chinese Animal Zodiac Year is displayed in a label.	10
If the input year is out of range, "Out of Range" is displayed (either in the label or in a message box).	2
If the correct Chinese Animal Zodiac Year is displayed (regardless of labeling or out of range detection), additional credit if the image of the appropriate animal is displayed next to the textual output. Must work for all 12 animals. No partial credit.	5
TOTAL	20

Make A Face (30 points)
Visual Basic - Ruberic

	Max Points
Title of problem and team's name are displayed.	1
Form contains a slider.	1
Slider's min and max values are 50 and 200.	1
Combo box lists at least six colors.	1
Slider and combo box are labeled appropriately.	1
When user clicks on the form, a face, or part of a face (for partial credit) is drawn as follows:	
Outline of Face:	
• A circle (for the face) is drawn.	4
• Circle's center is click location.	4
• Circle's radius is value of slider.	4
Eyes (no credit if no face circle):	
• Two smaller circles for eyes, not intersecting each other, are drawn inside the face circle	3
• Both eye circles are filled with the eye color selected in the eye color combo box.	3
Mouth (no credit if no face circle):	
• A semicircle representing a smile (lower half of circle), not intersecting the eye circles, is drawn inside the face circle.	3
Eyes and Mouth are placed and sized proportionally to the size of the circle (works for large or small faces, no partial credit, no credit if no face circle).	4
TOTAL	30