CS 215 – Study Questions 9
MFC Graphics

1. When you create an empty Visual Studio 2013 Windows 32 Project, what folders are generated?

2. In which folder should your code (.h and .cpp) files be placed?

3. In which folder should your resource (.rc and .bmp) files be placed?

4. The header for the description of the class CLab09Win is:
   
   ```
   class CLab09Win : public CFrameWnd
   ```

   What is the purpose of the `public CFrameWnd` clause?

5. How does the `CFrameWnd Invalidate` function differ from the `InvalidateRect` function? When would you use each?

6. In step 13 of Part 2 we added a new variable called Where to the CGraphicsShape class. What is the purpose of this variable?

7. What variables must be modified by the CGraphicsShape function Move? Why?

8. What variables must be modified by the CGraphicsShape function Resize? Why?

9. Both MoveShape and ResizeShape return a CRect object. What does the rectangle returned by these function reflect?

10. What is the function of the CPaintDC function TransparentBlt? What values are passed to this function?

11. If you wanted to add the color cyan to your palette, how would you find the appropriate RGB values? What are they?

12. Given the following segment of MFC C++ code, what is stored in R3? In R4?

   ```
   CRect R1 = CRect (10, 20, 50, 60);
   CRect R2 = CRect (30, 40, 70, 80);
   CRect R3 = R1 | R2;
   CRect R4 = R1 & R2;
   ```

13. In step 15 of Part 2 we modified the InShape function for the CGraphicsShape class.
   a. What is the purpose of this function?
   b. Why does this function differentiate between squares and circles?
   c. How do you determine if a point is in a square?
   d. How do you determine if a point is in a circle?
   e. Given a triangle with center (CenterX, CenterY) and vertices (VX1, VY1), (VX2, VY2), and (VX3, VY3), how would you determine if a point (x,y) is in the triangle?
14. How does the behavior of the OnPaint function of an MFC program change when “InvalidateRect (modified);” is used instead of “Invalidate (TRUE);”?

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16. Explain the purpose and function of the following segment of MFC C++ code:
   ```cpp
   CBitmap Image;
   int res = Image.LoadBitmap(ImageName.c_str());
   CDC memDC;
   memDC.CreateCompatibleDC(dc);
   memDC.SelectObject(&Image);
   dc->TransparentBlt (Where.left+1, Where.top+1, Where.Width()-2,
                      Where.Height()-2, &memDC, 0, 0, 80, 80, SRCCOPY);
   ```

17. The following code is designed to determine if the point (x,y) is located inside of the rectangle described by the integer variables to, bottom, left, and right. It does not work. Why?
   ```cpp
   bool IsIn (int x, int y, int top, int bottom, int left, int right) {
      if (x < left || right)
         return false;
      if (y > top && > bottom)
         return true;
      return false;
   }
   ```

18. Rewrite the function in the previous question so that it will return true if (x,y) is in the rectangle.

19. What is the purpose of the CGraphicsWin class? Of the CGraphicsApp class?

20. What is a message map?

21. When is the OnPaint function of the CGraphicsWin class called?

22. Why did we add a vector to the shapes application we created for Lab 9?