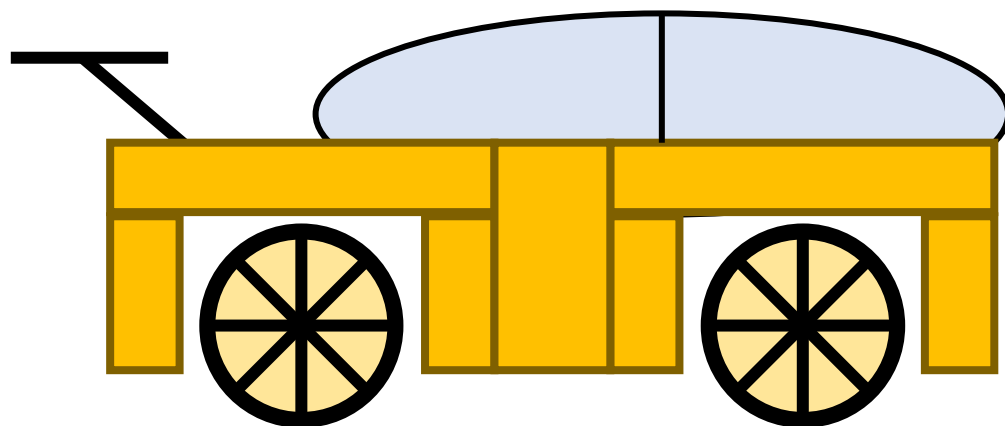
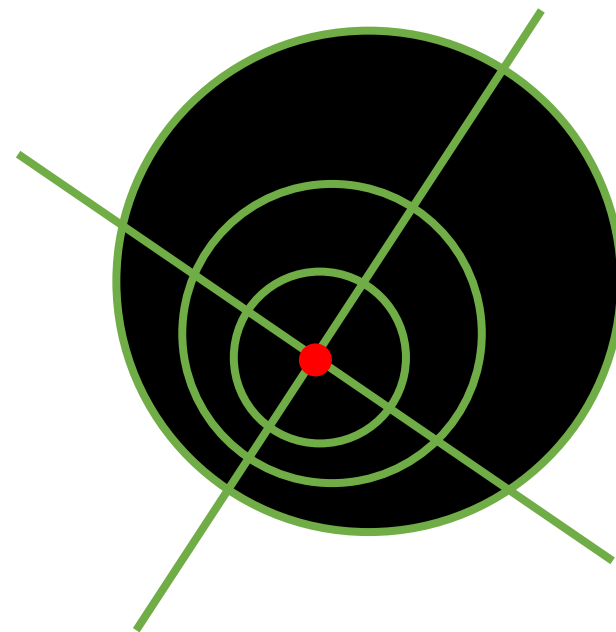




WinAPI

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2022

WinMain

```
int WINAPI WinMain()  
{  
    WNDCLASS wcx;  
    wcx.lpfnWndProc = (WNDPROC) MainWndProc;  
    wcx.hbrBackground = GetStockObject(WHITE_BRUSH);  
    ...  
    RegisterClass(&wcx);  
    HWND hWnd = CreateWindow("ITU", 200, 25, 1500, 950, ...);  
    ...  
    ShowWindow(hWnd, nCmdShow);  
    UpdateWindow(hWnd);  
    ...  
}
```

```
while((bRet = GetMessage( &msg, NULL, 0, 0 )) != 0)
{
    if (bRet == -1)
    {
        // handle the error and possibly exit
    }
    else
    {
        TranslateMessage(&msg);
        DispatchMessage(&msg);
    }
}
```

MainWndProc

```
LRESULT CALLBACK MainWndProc(HWND hWnd, UINT uMsg, WPARAM  
wParam, LPARAM lParam)  
{  
    switch (uMsg)  
    {  
        case MESSAGE_TYPE:  
            /*process message*/  
    }  
}
```

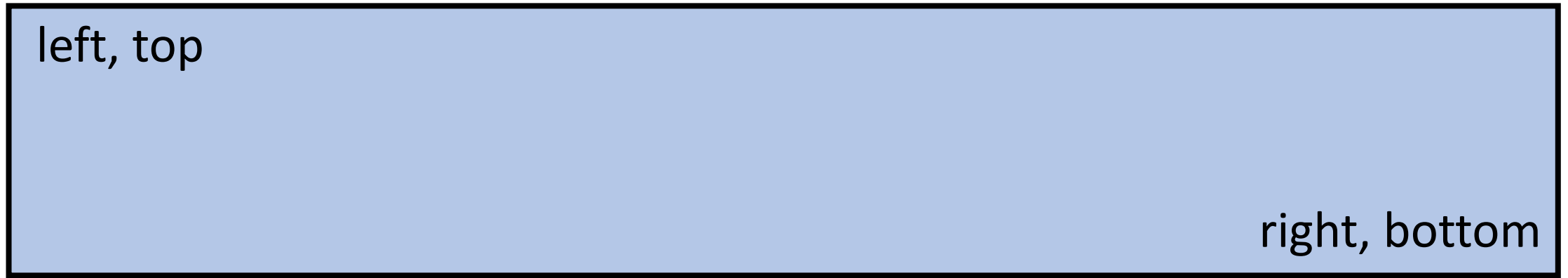
Messages

- WM_KEYDOWN, WM_CHAR
- WM_MOUSEMOVE, WM_LBUTTONDOWN, WM_LBUTTONUP
- WM_PAINT

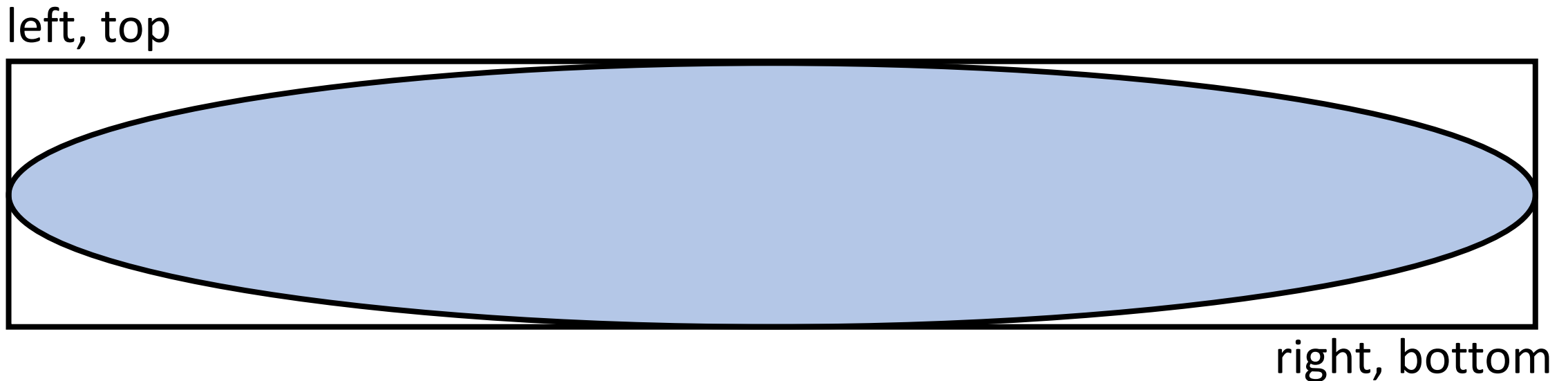
Painting

```
HDC          hDC;  
PAINTSTRUCT ps;  
  
InvalidateRect(hWnd, NULL, TRUE);  
  
case WM_PAINT:  
    hDC = BeginPaint(hWnd, &ps);  
    draw(hWnd, hDC, ps, posX, posY, cursorPosition, ...);  
    EndPaint(hWnd, &ps);  
    DeleteDC(hDC);  
    break;
```

```
Rectangle(HDC hDC, int left, int top, int right, int bottom);
```

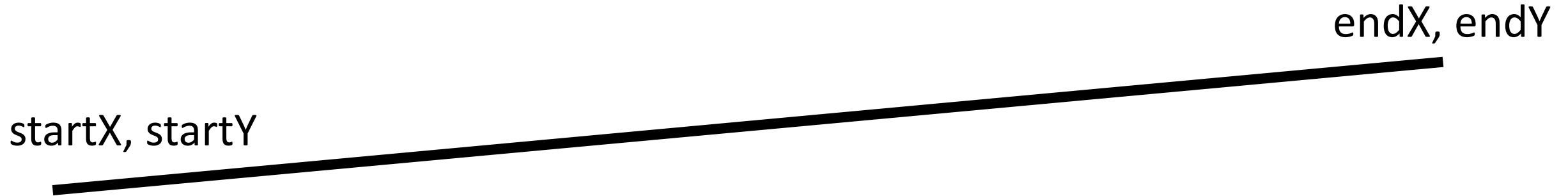


```
Ellipse(HDC hDC, int left, int top, int right, int bottom);
```



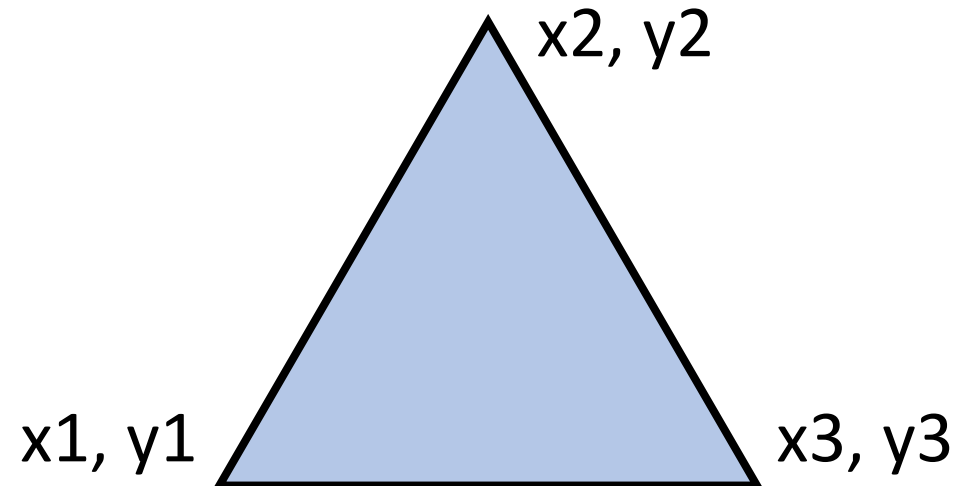
```
MoveToEx(HDC hDC, int startX, int startY, NULL);
```

```
LineTo(HDC hDC, int endX, int endY);
```



```
POINT vertices[] = {{x1, y1}, {x2, y2}, {x3, y3}};
```

```
Polygon(HDC hDC, vertices, 3);
```




```
Rectangle(hDC, 50, 50, 500, 100);
```



```
HPEN pen = CreatePen(PS_SOLID, 5, RGB(0, 0, 0));
```

```
SelectObject(hDC, pen);
```

```
Rectangle(hDC, 50, 50, 500, 100);
```



```
SelectObject(hDC, GetStockObject(DC_BRUSH));
```

```
SetDCBrushColor(hDC, RGB(255, 0, 0));
```

```
Rectangle(hDC, 50, 50, 500, 100);
```



```
DeleteObject(pen);
```

Moving objects

```
switch (uMsg)
{
    case WM_KEYDOWN:
        switch (wParam)
        {
            case VK_LEFT:
                posX -= 5;
                InvalidateRect(hWnd, NULL, TRUE);
                break;
            case VK_UP:
                posY -= 5;
                InvalidateRect(hWnd, NULL, TRUE);
                break;
        }
    }
}
```

```
case WM_MOUSEMOVE:  
    GetCursorPos(&cursorPosition);  
    ScreenToClient(hWnd, &cursorPosition);  
    InvalidateRect(hWnd, NULL, TRUE);  
    break;
```

Body

- Vykreslete několik základních objektů (čáry, obdelníky, elipsy, polygony, ...) – 1
- Implementujte pohyb některých objektů (využijte reakci na klávesnici nebo myš) – 1
- Implementujte změnu barev některých objektů (využijte reakci na klávesnici nebo myš)* – 1
- Vykreslete složitější objekt sestávající s více jednoduchých, který reaguje na klávesnici a myš (auto, panáček, abstrakt, ...) – 1
- Vysvětlete princip fungování aplikace ve WinAPI (zpracování zpráv, jak dojde k vykreslení do okna, co dělá funkce InvalidateRect, ...) – 1

*Pokud pohybuje objektem pomocí myši, implementujte změnu barev pomocí kláves a naopak.