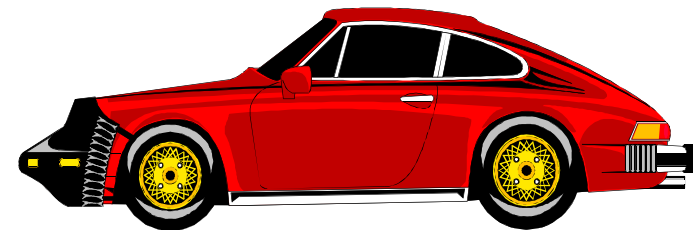
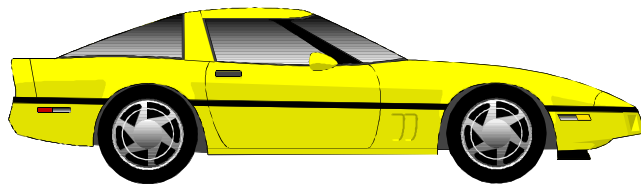
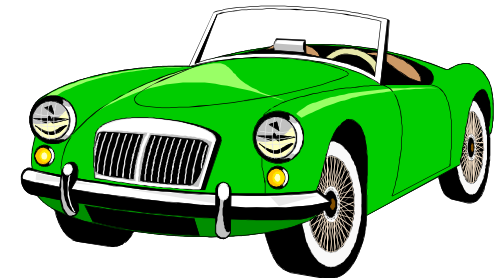
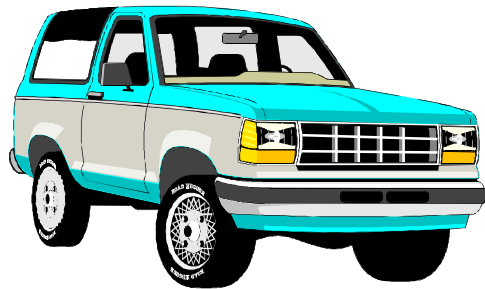




A circular inset showing a hand holding a credit card, with a blurred background of a person in a suit.

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

The Application Idle Engine



The Traffic Manager

AIE Overview



§ Traps for events such as:

- Keypress
- Card Swipe
- COM Port Input

§ When an event occurs, the engine references a programmer-defined table to determine which function to execute

Application Initialization



§ Application should call *appl_coldboot()* that executes system initialization tasks:

- Open system devices
- Set and/or test flags
- Perform file maintenance
- Copy CONFIG.SYS data to files or variables
- Set up user passwords

§ Call the idle state engine

- After system initialization
- *aie_main()*

Application Idle Engine Requirements



§ AIE Required Functions:

- `appl_idle_loop()`
- *Slow poll function*
- *Fast poll function*

§ Tables:

- `idle_table[]`
- `appl_table[]`

§ User-Defined Functions

Appl_idle_loop()



- § Primary loop in the engine
- § Passed as a parameter to `aie_main()`
- § Should be of type `AIEPROC`
 - `typedef short (* AIE Proc) ();`
- § Called immediately after timers are set, and then once per cycle
- § May be used for timed events:
 - Idle display management
 - Automatic upload/download of files
 - Automatic settlement
 - Error processing
 - Print spooler management

Slow Poll Function



- § Defined by the application
- § Should be of type AIEPROC
 - `typedef short(* AIE Proc) ();`
- § Passed as a parameter to `aie_main()`
- § Called by AIE every 250 ms during idle state
- § Determine if programmer-defined events have occurred
- § Slow Poll function timer can be changed and determined using the following functions:
 - `appl_idle_get_slow_poll_time()`
 - `ppl_idle_set_slow_poll_time()`

Fast Poll Function



- § Defined by the application
- § Should be of type AIEPROC
 - `typedef short(* AIE Proc) ();`
- § Passed as a parameter to `aie_main()`
- § Called by AIE every 50 ms during idle state
- § Determine if programmer-defined events have occurred
- § Slow Poll function timer can be changed and determined using the following functions:
 - `appl_idle_get_fast_poll_time()`
 - `appl_idle_set_fast_poll_time()`

Handling the CANCEL Key



- § CANCEL key handling is the responsibility of the programmer
- § Use `act_kbd_pending_test(KEY_CANCEL)` to determine if the CANCEL key is pending
- § AIE periodically checks (50 ms) for the CANCEL key and flushes the keyboard

Branch Table – `idle_table[]`



- § Called the “branch table.”
- § Table containing an an index to function pointers (defined in the Function table)
- § Passed as a parameter to `aie_main()`
- § Each entry has the following members:
 - Event to process (`applidl.h`)
 - Index into the application table (`appl_table[]`)
 - New branch table to access on return from the function

AIE Branch Table



```
BRANCH_TBL_ENTRY    idle_table[] =
{
    {COMMON_FUNC,      FT_COMMON,      idle_table },
    {EXIT_FUNC,        FT_EXIT,        idle_table },
    {ERROR_FUNC,       FT_ERROR,       idle_table },
    {ENTRY_FUNC,       FT_ENTRY,       idle_table },
    {KEY1,             FT_SALE,        idle_table },
    {KEY2,             FT_FORCE,       idle_table },
    {KEY3,             FT_CREDIT,      idle_table },
    {KEY4,             FT_VOID,        idle_table },
    {KEY_CR,           FT_FUNC,        func_table},
    {END_TABLE,        NO_KEY,         idle_table }
};
```

Function Table – `appl_table[]`



- § An array of pointers to integer functions.
- § Each element is the name of an application-defined function that processes an event:
 - Every entry in the `idle_table[]` must have a corresponding entry in the `appl_table[]`
 - For ease of reference, include the `#define` directive above the function name.
 - `#define` values must start with 0 and continue in ascending order

Function Table – Example with #define



```
PF_TABLE appl_table[] = {#define FT_SALE      0
                           sale_tran,
                           #define FT_FORCE    1
                           force_tran,
                           #define FT_CREDIT    2
                           credit_tran,
                           #define FT_VOID      3
                           void_tran,
                           #define FT_FUNC      4
                           func_main,
                           #define FT_COMMON    5
                           idle_common,
                           #define FT_EXIT      6
                           idle_exit,
                           #define FT_ERROR     7
                           idle_error,
                           #define NO_KEY       8
                           not_available,
                           #define FT_CLEARKEY  9
                           trap_clr_key,

                           (PF_TABLE) END_TABLE };
```

User-Defined Functions



- § All functions referenced in the function table must be of type integer (short) with one short state parameter
- § Event processing functions must return integers of the following values:
 - value < 0 indicating an error occurred
 - BRANCH_EXIT to continue processing
 - Valid event number
- § Example:

```
short sale_tran(short state)
{
    return (BRANCH_EXIT);
}
```

LAB Exercise



LAB6: Application Idle Engine

Make use of the idle engine framework to implement simple menus and obtain user entered values.