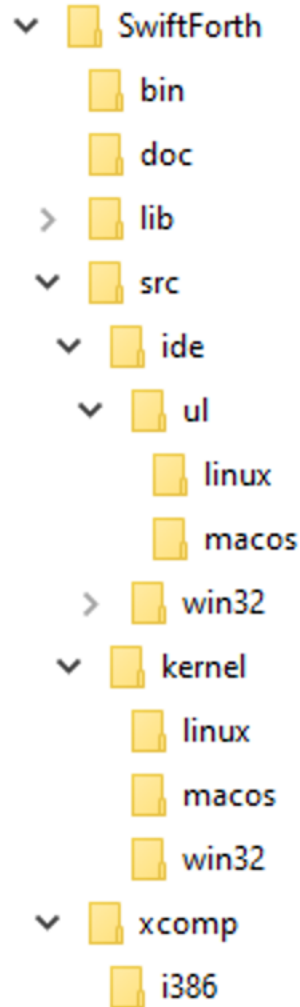


SwiftForth x64

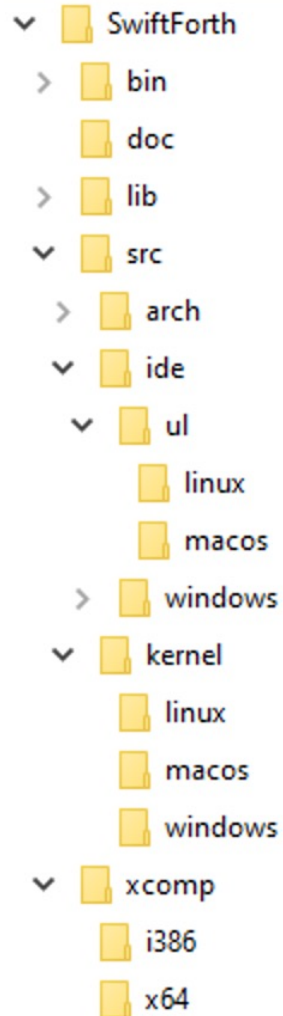
Porting SwiftForth from 32-bit i386
to 64-bit x64



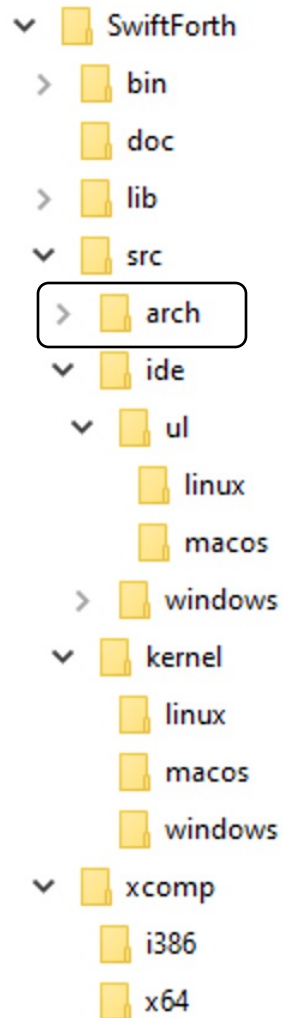
Old Directory Structure
























New Directory Structure



New Directory Structure



Arch Directory Detail

- ▼  arch
 - ▼  i386
 - ▼  ide
 - ▼  ul
 -  linux
 -  macos
 - >  windows
 - ▼  kernel
 -  linux
 -  macos
 -  windows
 - ▼  x64
 - ▼  ide
 - ▼  ul
 -  linux
 -  macos
 - >  windows
 - ▼  kernel
 -  linux
 -  macos
 -  windows



i386 Register Model

| Register | SwiftForth assignment |
|----------|---------------------------|
| EBX | Top of stack |
| ESI | User pointer |
| EDI | Base of SwiftForth memory |
| EBP | Data stack pointer |
| ESP | Return stack pointer |



x64 Register Model

| Register | SwiftForth assignment |
|----------|---------------------------|
| RBX | Top of stack |
| RSI | User pointer |
| RDI | Base of SwiftForth memory |
| RBP | Data stack pointer |
| RSP | Return stack pointer |
| R13 | Locals frame pointer |
| R14 | Loop index |
| R15 | Loop limit |



Code Optimizer

```
: DIGIT ( n1 -- n2 )  
  DUP 9 > IF 7 + THEN [CHAR] 0 + ;
```

| | | | |
|--------|-------------------|----------------------|----------|
| 4A5151 | -8 [RBP] RBP LEA | 488D6DF8 | DUP |
| 4A5155 | RBX 0 [RBP] MOV | 48895D00 | |
| 4A5159 | -8 [RBP] RBP LEA | 488D6DF8 | 9 |
| 4A515D | RBX 0 [RBP] MOV | 48895D00 | |
| 4A5161 | 9 # RBX MOV | 48BB0900000000000000 | |
| 4A516B | 41664B (>) CALL | E8DB14F7FF | > |
| 4A5170 | RBX RBX OR | 4809DB | IF |
| 4A5173 | 0 [RBP] RBX MOV | 488B5D00 | |
| 4A5177 | 8 [RBP] RBP LEA | 488D6D08 | |
| 4A517B | 4A519B JZ | 0F841A000000 | |
| 4A5181 | -8 [RBP] RBP LEA | 488D6DF8 | 7 |
| 4A5185 | RBX 0 [RBP] MOV | 48895D00 | |
| 4A5189 | 7 # RBX MOV | 48BB0700000000000000 | |
| 4A5193 | 0 [RBP] RBX ADD | 48035D00 | + |
| 4A5197 | 8 [RBP] RBP LEA | 488D6D08 | |
| 4A519B | -8 [RBP] RBP LEA | 488D6DF8 | [CHAR] 0 |
| 4A519F | RBX 0 [RBP] MOV | 48895D00 | |
| 4A51A3 | 30 # RBX MOV | 48BB3000000000000000 | |
| 4A51AD | 0 [RBP] RBX ADD | 48035D00 | + |
| 4A51B1 | 8 [RBP] RBP LEA | 488D6D08 | |
| 4A51B5 | RET | C3 | ; |



Code Optimizer

```
: DIGIT ( n1 -- n2 )  
  DUP 9 > IF 7 + THEN [CHAR] 0 + ;
```

| | | | | |
|--------|----------|-----|--------------|------------|
| 41CF4B | 9 # RBX | CMP | 4883FB09 | 9 > |
| 41CF4F | 41CF59 | JLE | 0F8E04000000 | IF |
| 41CF55 | 7 # RBX | ADD | 4883C307 | 7 + |
| 41CF59 | 30 # RBX | ADD | 4883C330 | [CHAR] 0 + |
| 41CF5D | RET | | C3 | ; |



Portability

- Windows API Structures

```
typedef struct tagWNDCLASSEXA {
    UINT        cbSize;
    UINT        style;
    WNDPROC     lpfnWndProc;
    int         cbClsExtra;
    int         cbWndExtra;
    HINSTANCE   hInstance;
    HICON       hIcon;
    HCURSOR     hCursor;
    HBRUSH      hbrBackground;
    LPCSTR      lpzMenuName;
    LPCSTR      lpzClassName;
    HICON       hIconSm;
} WNDCLASSEXA, *PWNDCLASSEXA, *NPWNDCLASSEXA, *LPWNDCLASSEXA;
```



Old SWOOP Classes

```
typedef struct tagWNDCLASSEXA {
    UINT        cbSize;
    UINT        style;
    WNDPROC     lpfnWndProc;
    int         cbClsExtra;
    int         cbWndExtra;
    HINSTANCE   hInstance;
    HICON       hIcon;
    HCURSOR     hCursor;
    HBRUSH      hbrBackground;
    LPCSTR      lpzMenuName;
    LPCSTR      lpzClassName;
    HICON       hIconSm;
} WNDCLASSEXA, *PWNDCLASSEXA
```

```
CLASS WNDCLASSEX
    VARIABLE size
    VARIABLE style
    VARIABLE WndProc
    VARIABLE ClsExtra
    VARIABLE WndExtra
    VARIABLE Instance
    VARIABLE Icon
    VARIABLE Cursor
    VARIABLE Background
    VARIABLE MenuName
    VARIABLE ClassName
    VARIABLE IconSm
```



New SWOOP Classes

```
typedef struct tagWNDCLASSEXA {  
    UINT        cbSize;  
    UINT        style;  
    WNDPROC     lpfnWndProc;  
    int         cbClsExtra;  
    int         cbWndExtra;  
    HINSTANCE   hInstance;  
    HICON       hIcon;  
    HCURSOR     hCursor;  
    HBRUSH      hbrBackground;  
    LPCSTR      lpzMenuName;  
    LPCSTR      lpzClassName;  
    HICON       hIconSm;  
} WNDCLASSEXA, *PWNDCLASSEXA
```

```
CLASS WNDCLASSEX  
    LARIABLE size  
    LARIABLE style  
    VARIABLE WndProc  
    LARIABLE ClsExtra  
    LARIABLE WndExtra  
    VARIABLE Instance  
    VARIABLE Icon  
    VARIABLE Cursor  
    VARIABLE Background  
    VARIABLE MenuName  
    VARIABLE ClassName  
    VARIABLE IconSm
```



Memory Access

- 16-bit

W! (x addr --)

W@ (addr -- u)

W@S (addr -- n)

WVARIABLE <name>

- 32-bit

L! (x addr --)

L@ (addr -- u)

L@S (addr -- n)

LVARIABLE <name>

