Software Development Seminar

Overlay (Advanced)
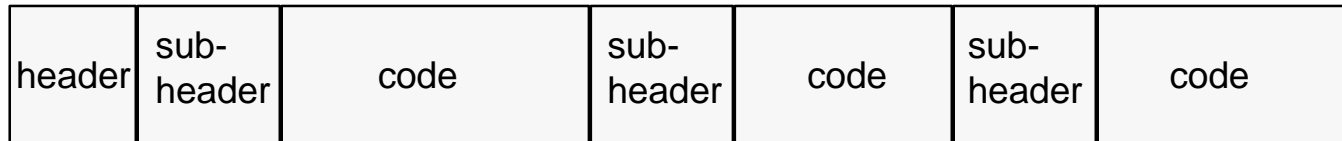
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Overlay (shared library) Overview

Methods for reading and executing a program from a CD

(1) Read an EXE file using CD function and Exec()

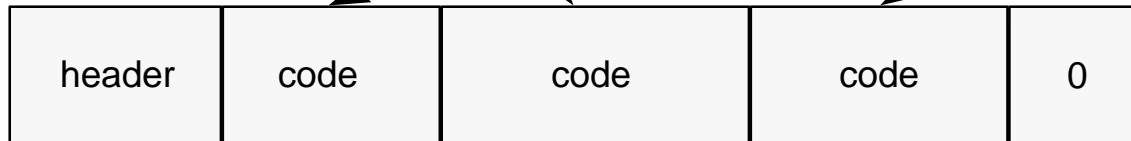(2) Use LoadExec()

(3) Using Overlay

Execution file format

. CPE file

header	sub-header	code	sub-header	code	sub-header	code

• Execute from RUN.EXE (Development units only)

.EXE file

header	code	code	code	0

• Launch from CD-ROM
• Length in multiples of 2048

.BIN file

code

• Launch from CD-ROM
• Overlay

SONY

Sony Computer Entertainment Inc.

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Advantage: Can launch independently in a child program only

Disadvantage: When control is transferred from parent to child and child to parent, it is necessary to stop all interrupts

Method to read an EXE file using a CD function and perform Exec()

Initial value of parent stack pointer

Initial value of child stack pointer

library
child (.EXE)
library
parent (.EXE)
System area

Load address of child

Load address of parent
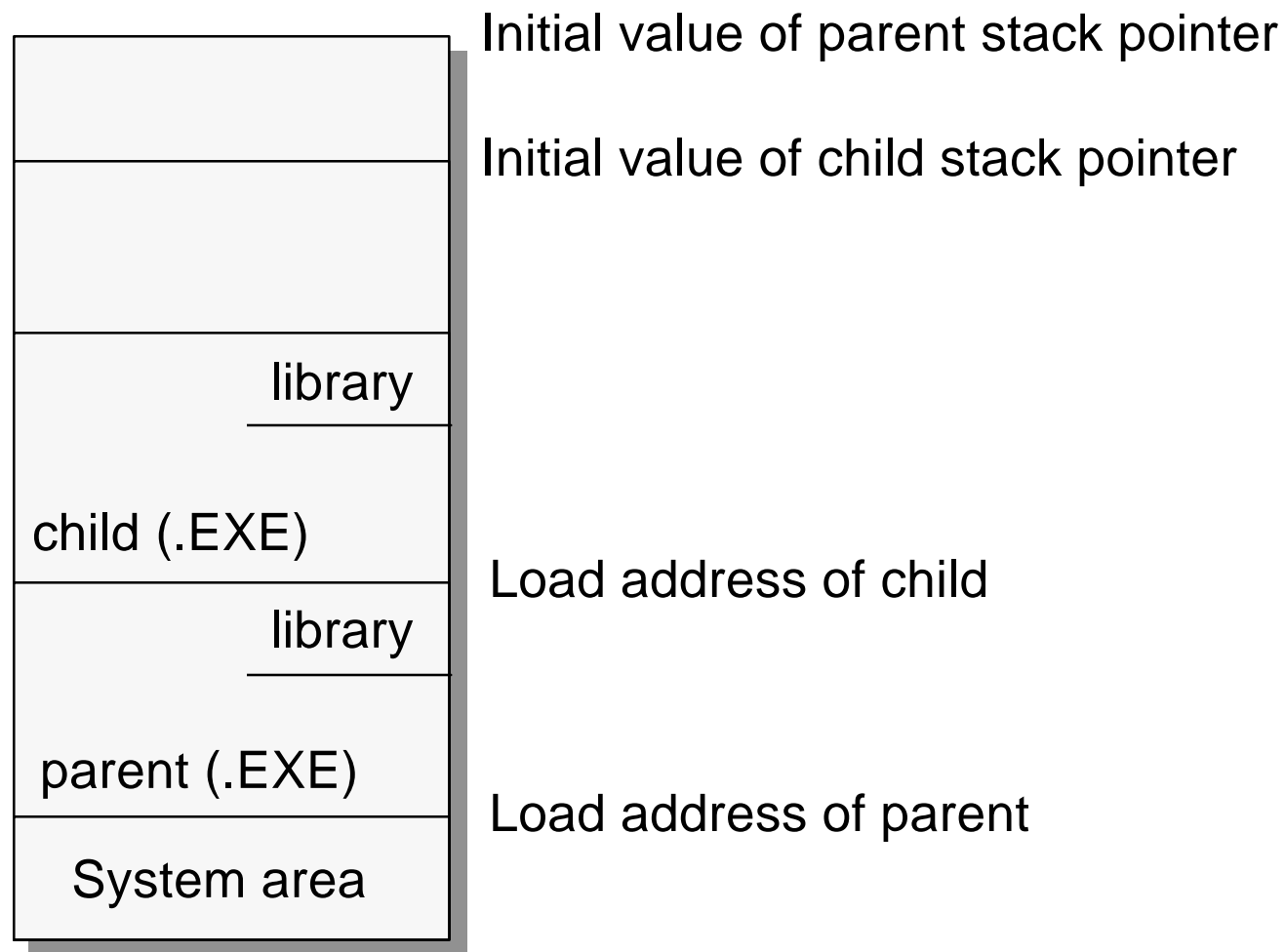
(2) Method using LoadExec()

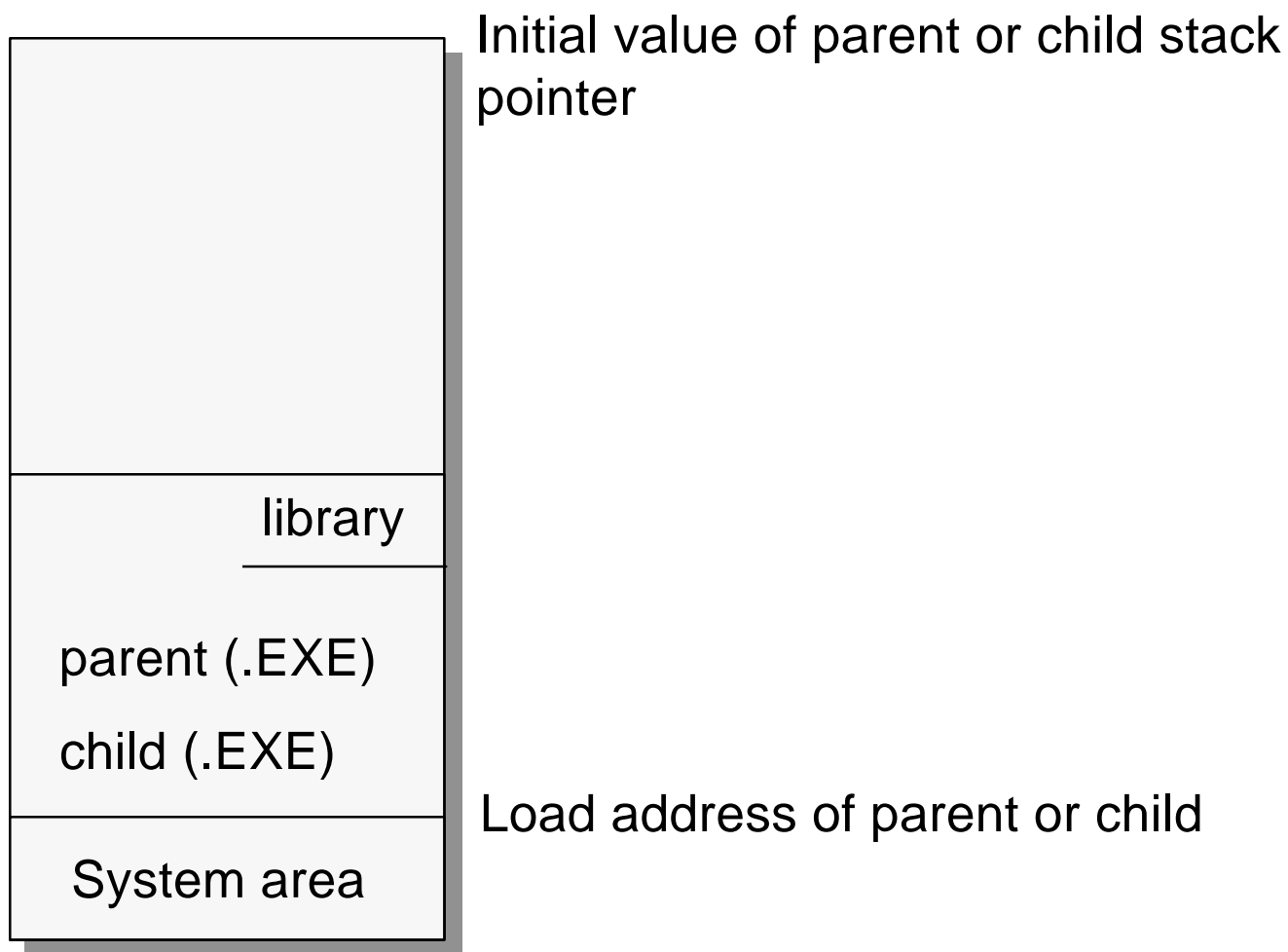Advantages: Can launch independently in a child
program only

Can load over the parent

Disadvantages: When control is transferred from
parent to child and child to parent, it is
necessary to stop all interrupts

Must be executed from _96_init()

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Method using LoadExec()

Initial value of parent or child stack pointer

library
parent (.EXE)
child (.EXE)
System area

Load address of parent or child

(3) Method using overlay

Advantages: Child is called in the functional unit

  (Load is invoked in the user manager)

  Library is shared between parent and child

   ⟹ Not necessary to stop interrupts

   ⟹ A separate process can be executed while the child is loading
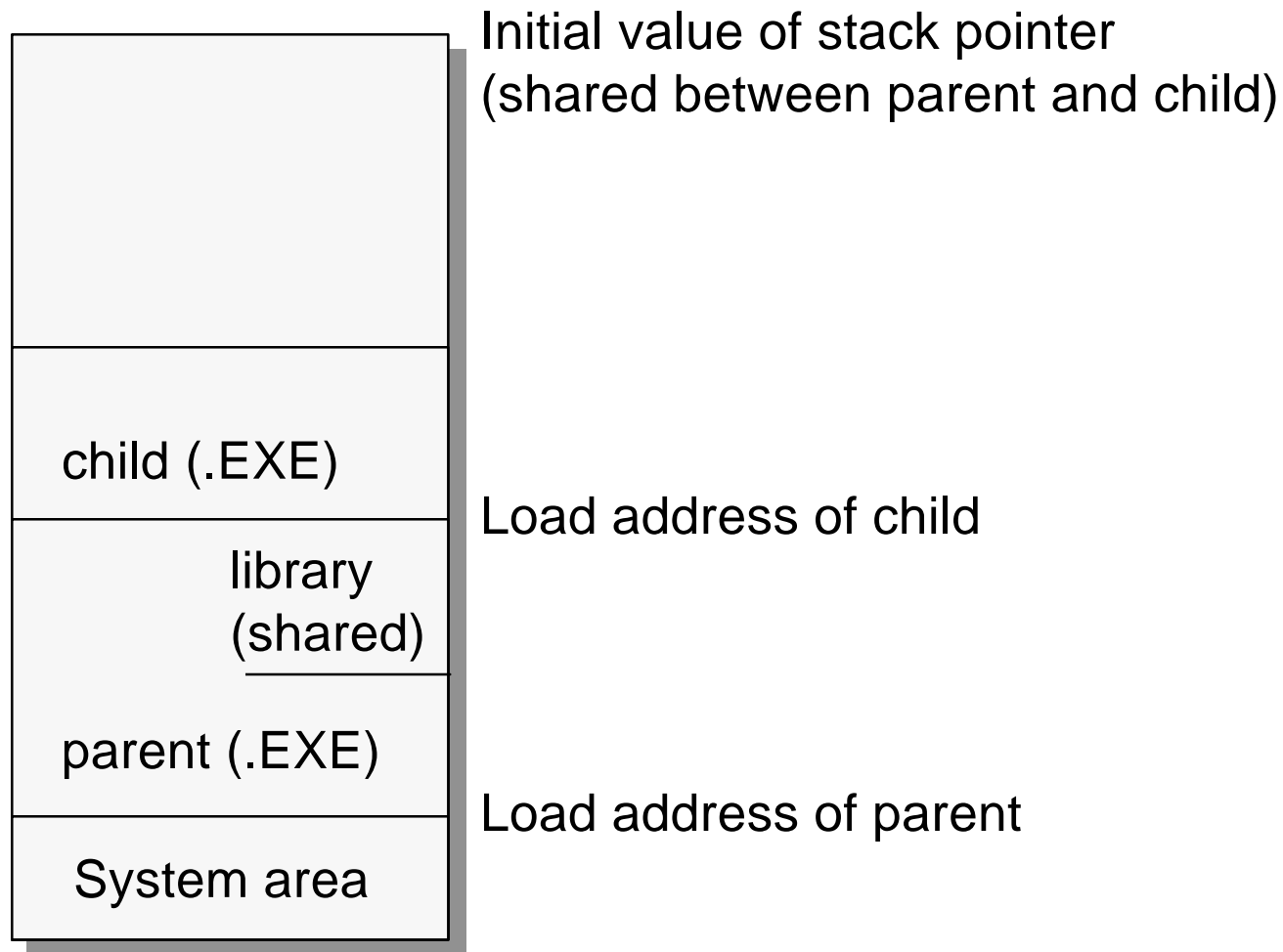
Disadvantages: The make operation is a little more complex

  Libraries must be completely linked into the parent side

   ⟹ Size of the parent is larger

Method using overlay

Initial value of stack pointer
(shared between parent and child)

child (.EXE)

Load address of child

library
(shared)

parent (.EXE)

Load address of parent

System area

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Overlay Programming

Overlay programming

(1) Makefile description

(2) Link file description

(3) Address file description

(4) Parent loader description

Sample program (Menu)

Parent: Display menu

Select the child, load and execute

Child: balls (Sample sprite display)

rcube (Sample 3D display)

anim: (Sample movie)

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(1) Makefile

Using the link file with psylink

psylink /c /m /v @menu.lnk,menu.cpe,
                              menu.sym,menu.map

Child compile options -GO, -Wa, s[name]

ccpsx -O3 -G0 -c -Wa,sballs balls.c

G0 : create code without using GP
Wa : pass options to the assembler (ASPSX) after the
        comma Wa, s[name]
          Wa,s[name]
                using this module's group name

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(2) Link file

General link file description

      1) org setting

      2) group setting

      3) section setting

      4) include file

      5) inclib file

      6) pc initial value setting

org setting

1) org setting

The target machine code location is made known to the assembler

(Example)
      org $80010000

group setting

2) group setting

A group is a collection of sections

You can set attributes of each group

bss	: uninitialized data
org(address)	: org setting address
file(file)	: output binary as a file
over(group)	: overlay to group

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group setting

(Example)

```
text      group    org($80010000)
bss       group     bss
balls     group     file("balls.bin"),org($80100000)
rcube     group     over(balls),file("rcube.bin")
```

section setting

3) section setting

Allocate a group in each section

Normally, the compiler creates a section in the six parts below

.rdata	read only data
.text	code
.data	initialized data
.sdata	initialized data (small)
.sbss	initialized data (small)
.bss	initialized data

section setting

(Example)

```
section    .rdata,text
section    .text,text
section    .data,text
section    .sdata,text
section    .sbss,bss
section    .bss,bss
```

include, inclib file

4) include file

Describes the file that is linked

(Example)
include main.obj

5) inclib file

Describes the library file

(Example)
inclib "c:\psx\lib\libapi.lib"

pc initial value setting

6) pc initial value setting

Set program counter (pc) initial value
Normally set to __SN_ENTRY_POINT

(Example)
regs   pc=__SN_ENTRY_POINT

(3) Address file

Set load address of child program

```
                opt          c+

    balls       group
                xdef              LoadAddress


                section      .rdata


    LoadAddress    dw     group(balls)
```

(4) Parent loader description

As needed, read the BIN file to the LoadAddress

Overlay module debugging

1) Compile option -g

Necessary for source level debugging

2) Linker option /v

Necessary for overlay debugging

Overlay application

Title

Opening basic game

Replace according to overlay

EXE File 1

Replace in LoadExec

BIN File 1

EXE File 2

System area

System area

BIN File 2

BIN File 3...