anadrol

053.314.328-40 Identificação

custom\_dictionaries\_only

custom\_terms\_only

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new{}

new{}

initialize

getOptions

AlgorithmFactory

new{}

object

Algorithm

new{} initialize

getOptions

initialize

create

main() create

run

EventSelector

select

EventDataSvc

DetectorDataSvc

initialize

initialize

find

register

newevent

doevent

doevent

syncho

EvtPersistencySvc

load

save

DataItemSelector

save

Illustration 3.6 Collaboration diagram for the application initialization and basic event loop

System Design

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3.10.2Retrieving and storing event objects

The framework has to guarantee that we are able to retrieve and store data objects from the persistent

storage:

• An Algorithm is asking the EventDataSvc for an object with a given identifier. If the object is not

in the transient event store, i.e. it has not been registered previously, it will trigger an action on

the EvtPersistencySvc.

• The EventDataSvc knows the “persistent address” of the required object because either it has the

root from where the object is hanging or the address has been deduced from the identifier. It also

knows the “type” of requested object from the root. Therefore, it uses this information to request

to the EvtPersistencySvc to load the object.

• The EvtPersistencySvc selects the appropriate Converter from a set of Converters that have been

declared at initialization by using the “type”. The Converter is called and locates the object in the

persistent store and creates a transient representation of the same object initialized with the

information of the persistent. It also fills the references of the new object to the other event or

detector data objects using the EventDataSvc or DetectorDataSvc.

• The new created data object is then registered by the EvtPersistencySvc and makes it available to

the Algorithm that requested it.

• Storing transient data objects after the processing is done following a similar collaboration

between the EvtPersistencySvc, EventDataSvc and the adequate Converter.

3.10.3Detector data synchronization

The detector data must be kept synchronized with the event which is currently being processed. This

is essential since the calibration, alignment and environmental data may change at any moment

during the execution of the job.

• When a new event root is loaded in the transient event store, the DetectorDataSvc is informed by

the ApplicationMgr together with the information of the event time.

• Each data object in the transient detector store has a validity time range. Assuming that the

events are ordered in time (this simplifies the case), the DetectorDataSvc compares the current

event time with the next time that any data becomes invalid.

• For most of the events, there is no action to be done since generally the validity ranges cover

many events. But in some cases, the DetectorDataSvc will scan all the transient detector store and

look for objects that need to be updated.

• The update of the object is done by the DetPersistencySvc which has the knowledge of how to

find the new object in question knowing the event time.

• The object members are updated without the need to delete and create new objects. In this way

references to them are still valid, so Algorithms can just use them without the need of knowing

that a new calibration or alignment is being used.

Component Interactions

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Event Transient Store

Algorithm

object

Converter

EvtPersistencySvc

EventDataSvc

Persistent

StorageMS

1:retrieveObject

2:getAddress

Node:DataObject

:DataObject

3

4:createObj

5:createObj

6:read

7:new{}

8

9:register

10

EventDataSvc

ApplicationMgr

1:setRoot

2:retrieveObj

3:checkValidity

Detector Transient Store

DetectorDataSvc

:DataObject

4:checkValidity

DetPersistencySvc

5:updateObj

object

Converter

Persistent

6:updateObj StorageMS

7:read

8:update

(a)

(b)

Illustration 3.7 Collaboration diagrams for some basic functionality of the transient event and detector data stores: (a)

retrieving and storing event data objects, (b) synchronizing the transient detector store with the current

event time.

System Design

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3.11 Physical Design

For large software systems, such as ours, it is clearly important to decompose the system

into hierarchies of smaller more manageable components.This decomposition of the system

can have important consequences for implementation related issues, such as compile-time

coupling, link-time dependencies, size of executables etc. The architecture must therefore

take into account physical design issues as well as the logical structure.

Physical design focuses on the physical structure of the system. A physical component is the

smallest unit of physical design and may contain several classes that together cooperate to

provide some higher level functionality. However larger systems require hierarchical

physical organization beyond the hierarchy of components. This can be achieved by

grouping related components together into a cohesive physical unit, which we call a

package. The notation used to represent packages follows that of Lakos [5] and is shown in

Illustration 3.8. Dependencies between packages reflect the overall dependencies among the

components comprising each subsystem.

A package is a collection of components that have a cohesive semantic purpose. It might

also consist of a loosely coupled collection of low-level re-usable components, such as STL.

In general the dependencies between packages are acyclic (cyclic dependencies should be

avoided at all costs). Physically a package consists of a number of header files and a single

library file.

Organizing software in terms of packages has several advantages:

• each package can be owned and authored by a single developer

• acceptable dependencies can be specified, and approved by the system architect, as part

of the overall system design

• highly coupled parts of the system can be assigned to a single package which makes

change management easier

• packaging aids incremental comprehension, testing and reuse

A design goal of physical design is to minimize the number of package dependencies

(Illustration 3.8 gives an example) which is done for the following reasons:

• improves usability i.e. do not link huge libraries just to use simple functions

• reduces number of libraries that must be linked

• minimizes size of executable image

Dependencies can be minimized by repackaging components e.g. by escalating a

component from a lower to a higher level.

Usability is enhanced by minimizing the number of header files that are exported. Header

files are exported only if a client of the package needs access to the functionality provided

by that component.

Physical design also addresses issues related to the management of the code repository and

release mechanism. The directory structure directly supports the organization of packages

and, the allocation of files to subdirectories depends on whether interfaces of components

are public or private.

Physical Design

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A package x DependsOn another package y if 1 or more

components in x DependsOn one or more components in y

k l

i j

Package Level 2 Level 2

Level 1

f g

b

a h

c d e

Package Level 1

Package a

Package b

DependsOn

v

s

k l

u

r

p q

i g h o

a b c j t d m e f n

v

s

k l

u

r

p q

o

g h

i

a b c

j

t

d

m

e f

n

Pkg A

Pkg B Pkg C

Pkg D

L1

L2

L1

L2

L1

L2

L3

L4

L1

L2

L1

L2

L3

L4

L5

L6

Illustration 3.8 Components, packages and their dependencies

System Design

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4

Application Manager

The Application Manager (ApplicationMgr) is the component that steers the execution of

the data processing application. There is only one instance of ApplicationMgr per

application.

In this chapter we will describe the functionality of this component, the interfaces it offers to

other components and its dependencies.

4.1 Purpose and Functionality . . . . . . . . . . . . . . . . 36

4.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 36

4.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 38

Application Manager

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4.1 Purpose and Functionality

The main purpose of the Application Manager (ApplicationMgr) is to steer any data processing

application. This includes all data processing applications for LHCb data at all stages: simulation,

reconstruction, analysis, high level triggers, etc. Specific implementations of the ApplicationMgr will

be developed to cope with the different environments (on-line, off-line, interactive, batch, etc.). The

ApplicationMgr implements the following functionality:

• The event loop. For traditional batch processing applications it implements the “event loop”. It

initializes all the components and services of the application. In particular it initializes the event

selector component with the selection criteria for the current job (which events need to be

processed, etc.). Then it requests the processing services of all the relevant processing elements

(Algorithms) for each event. Finally, it informs all the components when the job is done to allow

them to perform the necessary actions at the end of job (saving histograms, job statistics, etc.).

• Bootstraping the application. The ApplicationMgr is in charge of creating all the services and

processing components (Algorithms) needed to provide the desired functionality. The concrete

type of these components depending on the persistent object store, user interface system, etc. is

selected at run time based on the job options.

• Service & Algorithm information center. It maintains a directory of the major Services and

Algorithms which have been created by it directly or indirectly. It allows other components to

locate the requested service based on a name.

4.2 Interfaces

The ApplicationMgr provides the following interfaces:

• Service locator (ISvcLocator). Algorithms and services may ask the ApplicationMgr for

references to existing services belonging to the application. For example, to get a reference to the

MessageSvc which is needed by the Algorithm in order to output an error message.

• User interface (IAppMgrUI). Interface to the user interface to allow the user to interact with the

application. This interface is necessary for non-batch oriented applications.

• Properties interface (IProperty). This interface allows other components to modify the default

behavior of the ApplicationMgr by setting new values to properties. This interface is the same

interface implemented by the Algorithms and other components.

Interfaces

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ApplicationMgr

\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_

run()

<<interface>>

IProperty

\_\_\_\_\_\_\_\_\_\_

setProperty()

getProperty()

<<interface>>

ISvcLocator

\_\_\_\_\_\_\_\_\_\_

getService()

existsService()

addService()

removeService()

<<interface>>

IAppMgrUI

\_\_\_\_\_\_\_\_\_\_

nextEvent()

terminate()

finalize()

initialize()

MessageSvc

JobOptionsSvc

IQueryOptions

IMessage

EventDataSvc

AlgorithmFactory

ICreate

DetectorDataSvc

EventSelector

ISelector

ListSvc

ListAlg

IDataMgr

IDataProvider

IDataProvider

IDataMgr

Configured

Initialized

Active

ChangeCond DoingEvent

Stopped

(a)

(b)

Illustration 4.1 The ApplicationMgr main class diagram (a) and state diagram (b)

Application Manager

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4.3 Dependencies

The ApplicationMgr depends on the following services provided by other components of the

architecture:

• Job options service (JobOptionsSvc). The JobOptionsSvc service provides to the ApplicationMgr

the new values for its properties in case the user would like to overwrite the default ones. These

properties may drive the choice of the persistent mechanism, the algorithms which need to be

instantiated, the output stream for error messages, etc.

• Message service (MessageSvc). The ApplicationMgr uses the MessageSvc to report errors and

informational messages to the end user.

• Algorithm factory (AlgorithmFactory). The ApplicationMgr uses the AlgorithmFactory service to

create (instantiate) the concrete implementations of the Algorithm. In that way, the

ApplicationMgr does not need to be changed when new algorithms are introduced into the

system.

• Algorithms. Algorithms do the real physics data processing work.

• Event selector (EventSelector). The ApplicationMgr uses the event selector to generate the set of

events which will processed by the application.

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5

Algorithms

The Algorithm component is the support structure for real computational code. Any code

that a user would like to be executed within the framework must conform to the Algorithm

component specification1. This code may be for detector simulation, track reconstruction,

calorimeter cluster finding, analysis of B-decays or whatever. In practice ensuring this

conformity will be implemented by providing an Algorithm base class which must be

extended to form concrete algorithms. A general algorithm has properties or parameters

which tune the computation, one or more sources of input data, and one or more sources of

output data.

In this chapter we describe the Algorithm base class from which all concrete algorithms

must inherit. This interface allows the end-user to assemble and configure complex

applications using basic algorithms as building blocks.

5.1 Purpose and Functionality . . . . . . . . . . . . . . . . 40

5.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 40

5.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 40

1 Except ofcourse for specialised things such as converters.

Algorithms

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5.1 Purpose and Functionality

The purpose of a concrete algorithm is to convert a set of input data into a set of output data. The

actual computation depends upon the specific algorithm and also upon the values of any internal

parameters which may be set, for example, by the job options service.

Algorithms may only request data from the transient data services, e.g. the eventDataSvc, they know

nothing of the persistent world. Similarly any data produced by an algorithm which is to be passed

onto another algorithm or which is to be made persistent must be registed in one of these stores.

An algorithm may be executed once per event, or many times per event. For some types of algorithm

it may be interesting to execute them only in response to certain events, e.g. when the run changes or

when the current job is finished. Algorithms may be executed directly by the application manager or,

if nested, by the parent algorithm.

5.2 Interfaces

The Algorithm provides the following interfaces:

• Execution interface (IAlgorithm). It is through this interface that algorithm configuration and

execution is performed.

• Properties interface (IProperty). The Properties interface provides a hook to allow the setting of

the internal attributes of a concrete algorithm

5.3 Dependencies

The Algorithm depends on the following services provided by other components of the architecture:

• Job options service (JobOptionsSvc). The JobOptionsSvc service provides to the Algorithm the

new values for its properties in case the user would like to overwrite the default ones. These

properties may change the internal behavior of the Algorithm.

• Event data service (EventDataSvc). The Algorithm used the EventDataSvc to get access to the

data objects it needs to perform its function.

• Message service (MessageSvc). The Algorithm may need to send messages reporting its progress

or errors occurring either for debugging or logging.

• Algorithm factory (AlgorithmFactory). The Algorithm uses the AlgorithmFactory service to

create (instantiated) the concrete implementations of other Algorithms.

• Algorithms. The Algorithm may use other smaller algorithms to implement its function.

• Other services like EvtPersistecySvc, EventSelector, etc. are initialized by the ApplicationMgr in

Dependencies

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Algorithm

\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_

<<interface>>

IProperty

\_\_\_\_\_\_\_\_\_\_

setProperty()

getProperty()

<<interface>>

IAlgorithm

\_\_\_\_\_\_\_\_\_\_

doChange()

execute()

finalize()

initialize()

MessageSvc

JobOptionsSvc

IQueryOptions

IMessage

EventDataSvc

AlgorithmFactory

ICreate

DetectorDataSvc

IDataProvider

IDataProvider

(a)

Initialized

Active

Offline

finalize() initialize()

execute()

doChange()

(b)

Illustration 5.1 (a) The Algorithm class diagram

(b) The Algorithm internal state diagram

Algorithms

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6

Data Converter

A data Converter is responsible for translating data objects from one representation into

another. Concrete examples are e.g. converters creating transient objects representing parts

of an event from the persistent (and disk based) representations, or converters creating a

textual representation of data objects for printing to the alphanumeric terminal. Specific

Converters will be to be needed for each data type that needs to be converted. Any code that

a user needs to execute for converting data objects from one representation into another

must conform to the Converter component specification. In practice ensuring this

conformity will be implemented by providing an Converter base class which must be

extended to form concrete converters.

In this chapter we describe the Converter base class from which all concrete converters

must inherit.

6.1 Purpose and Functionality . . . . . . . . . . . . . . . . 44

6.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 46

6.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 46

Data Converter

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6.1 Purpose and Functionality

The data converters are responsible for translating data from one representation into another.

Concrete examples are e.g. converters creating transient objects from their persistent (disk based)

representations. Converters will have to deal with the technology both representations are based on:

in the upper example they have to know about the database internals as well as the structure of the

transient representations. The converters know about the mechanism to retrieve persistent objects

(ZEBRA, Objectivity, …) and only pass abstract instances of the converted objects, hence shielding

the calling service from internals.

Data converters are meant to be light. This means there will not be all-in-one converters, which are

able to convert the “world”, but rather many converters, each able to create a representation of a given

type.

In order to function a converter must be able to

• Answer (when asked) which kind of representation the converter is able to create and on which

kind of data store the source representation of the object resides.

• Retrieve the source object from the source store.

• Create the requested transient representation using the information contained in the source object.

• Initialize pointers in the transient representation of the created object.

• Update the transient representation using the information contained in the source object.

• Update pointers in the transient representation of the created object.

• Convert the transient representation to its target (e.g. persistent) representation.

• Resolve references within the target representation (persistent references).

• Update the target representation from the transient representation.

• Update references within the target representation (persistent references).

The conversion/creation mechanism of an object into another representation is a two step process:

• Firstly the raw object will be translated. This does not include any links pointing to other objects.

• At the second step the link will be converted.

Concrete user converters are based on a base class which deals with the technology specific actions.

The concrete converters hence only deal with data internal to the objects, e.g.

• Resolving pointers of the transient objects to objects in the detector description.

• Fill/update contained entries in the persistent representation which will not be identifiable by the

persistent store.

• The base class is in charge of resolving the generic “identifiable” references as they are accessible

from the directory of the transient DataObject. It is understood, that there is a correspondence

between the identifiable entries e.g. in the transient world and the persistent world.

Purpose and Functionality

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IInterface

<<Interface>>

IConverter

<<Interface>>

Converter

<<Implementation>

ObjtyConverter

<<Implementation>

ConcreteConverter

<<Implementation>

SicBxxConverter

<<Implementation>

IConverter

initialize () : StatusCode

getObjDataType () : const Class\*

getRepSvcType () : unsigned char

createObj (pAddress : IOpaqueAddress\*, refpObject : DataObject\*&) : StatusCode

fillObjRefs (pAddress : IOpaqueAddress\*, pObject : DataObject\*) : StatusCode

updateObj (pAddress : IOpaqueAddress\*, pObject : DataObject\*) : StatusCode

updateObjRefs (pObject : DataObject\*) : StatusCode

createRep (pObject : DataObject\*, refpAddress : IOpaqueAddress\*&) : StatusCode

fillRepRefs (pAddress : IOpaqueAddress\*, pObject : DataObject\*) : StatusCode

updateRep (pAddress : IOpaqueAddress\*, pObject : DataObject\*) : StatusCode

updateRepRefs (pAddress : IOpaqueAddress\*, pObject : DataObject\*) : StatusCode

<<Interface>>

Illustration 6.1 The Converter class diagram with a possible layering of increased functionality: ObjtyConverter and

SicBxxConverter can already handle the abstract data model leaving only “primitives” to the concrete

converter. Below the provisional definition of the interface as it is known to the calling services.

Data Converter

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6.2 Interfaces

IConverter: The interface allows the calling services to pass the necessary information to the

converter and to interact without coupling to internals.

6.3 Dependencies

The Converter depends on the following services provided by other components of the architecture:

• The generic Converter implementation (Converter) offers some standard functionality and eases

n the implementation of specific converters.

• Message service (MessageSvc). The Converter uses the MessageSvc to report errors and

informational messages to the end user.

• The data storage technology: Converters will have to deal with specific data stores like ZEBRA,

Objectivity etc.

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7

Job Options Service

The purpose of the job options service is to supply the options for the current job to other

components of the architecture. It is assumed that facilities allowing the user to edit the

options and to save or retrieve sets of them for future use are supplied outside this service.

7.1 Purpose and Functionality . . . . . . . . . . . . . . . . 48

7.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 48

7.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 50

Job Options Service

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7.1 Purpose and Functionality

The purpose of the job options service is to supply the options for the current job to other components

of the architecture. It is assumed that facilities allowing the user to edit the options and to save or

retrieve sets of them for future use are supplied outside this service.

The options may consist of:

• Flags that select the algorithms to be run in the current job.

• Values that override default properties of the algorithms

• Definition of the input data set

• Selection criteria for the input data

• Definition of output data streams (e.g. for event data, histogram data etc.)

• Definition of error reporting streams

• Etc.

A set of options is identified by the name of the set (SetName) (For example SetName could be the

full pathname of a file if the options are contained in a text file, or the identifier of a set in the options

database)

An option modifies the properties of a client. Each option consists of:

• The name of the client (ClientName) to whose properties will be modified by this option.

• The name of the property to be modified (PropertyName)

• The new value (or values) of the property (PropertyValues) (T = bool, int, double, string )

7.2 Interfaces

The JobOptionsSvc provides the following interfaces:

• Query options interface (IQueryOptions). This interface exposes the functionality of the

JobOptionsSvc. It provides the following methods:

• configure( string SetName ) This method allows a client to specify which set of job options is

to be used in the current context. Usually this will be used only once per job when

JobOptionsSvc is created.

• setMyProperties( IProperty \*me, string ClientName ) This method is used by a client who

wants to override the default values of its properties with those described in the job options.

The client must implement the IProperty interface, which will be used by setMyProperties to

set the client's properties.

• getOption( string ClientName, string PropertyName, vector<T> PropertyValues) This

method allows clients to retrieve the job option which modifies a given property of a given

client in the current context, if that option exists.

Interfaces

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JobOptSvc

\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_

<<interface>>

IQueryOptions

\_\_\_\_\_\_\_\_\_\_\_

configure()

setMyProperties()

getOption()

AClient

IsetProperty

OptionsArchive OptionsEditor

Illustration 7.1 The JobOptionsSvc class diagram

Job Options Service

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7.3 Dependencies

A given PropertyName can occur only once for a given ClientName. This implies that different

instances of a client class must have a different ClientName if they need different PropertyValues for

a given PropertyName.

The JobOptionsSvc depends on the following services provided by other components of the

architecture:

• ApplicationMgr. The context must be initialized by an external client. It is assumed that the

SetName is provided by the user e.g. as an input argument to main() or as an environment

variable.

• IProperty interface. Clients wishing to use the setMyProperties method must implement this

interface.

• OptionsArchive. An archive is needed for previously defined sets of options. For example this

could be a set of text files, or a database.

• OptionsEditor. An editor is needed to edit the set of options. For example this could be a text

editor, or a database editor.

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8

Event Selector

The event selector allows an end user to select, on the basis of physical properties, which

events will be processed by an application. The event selector is the component which

knows what is the next event to be processed.

In this chapter we will describe the functionality envisaged for this component, the

interfaces it offers to other components and its dependencies.

8.1 Purpose and Functionality . . . . . . . . . . . . . . . . 52

8.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 52

Event Selector

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8.1 Purpose and Functionality

The event selector (EventSelector) component is able to produce a list of events from a given set of

“selection criteria”. In general, for batch oriented applications, it is the ApplicationMgr that provides

the “selection criteria” to the EventSelector. For interactive applications, it is required that the end

user has the possibility to interact directly with the EventSelector by means of the UserInterface

component. The complexity of the “selection criteria” can vary from very simple to very

sophisticated involving looking at the event data and running some selection code to decide whether

the event is selected or not. Here are some examples of “selection criteria”:

• All the events of a given run number or within a range of run numbers.

• All the events between two dates that belong to a certain event classification.

• A discrete list of run number, event number pairs.

• All the events of a given persistent “event collection” identified by a name.

• A complex SQL query in the event data ODBMS.

• etc.

The EventSelector provides one or more iterator types to be used by the ApplicationMgr. It is the role

of the ApplicationMgr to enquire of the EventSelector which is the next event to be processed and to

setup correctly the corresponding data stores with that information. The EventSelector does not

necessarily need to have in memory all the handles of the selected events since event selections could

be very big.

It is not the role of the EventSelector to create persistent “event collections”. These collections are

created by specialized applications called “event selection applications”. The purpose of these

applications is to processes events from some general collections (i.e. runs), apply physics Algorithms

and select only those events that pass all the physics selection criteria, and finally to create an “event

collection” as output.

Responsibilities

• The EventSelector must be capable of examining data from any of the possible sources e.g. data

stored in an Objectivity database, data stored in ZEBRA format on tape etc.

• The EventSelector will accept user defined selection function objects.

8.2 Interfaces

The EventSelector provides the following interfaces:

• Event selection interface (IEvtSelector). This interface is used to tell the selector what is the

selection criteria, declare user selection functions, and obtain references to iterators.

• Selection user interface (ISelectorUI). This is the interface used by the UserInterface component

which allows the end user to interact with the selector.

• Properties interface (IProperty). This interface allows other components to modify the default

behavior of the EventSelector by assigning new values to its properties.

Interfaces

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MessageSvc

JobOptionsSvc

IQueryOptions

IMessage

EventSelector

\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_

Selector

<<interface>>

IProperty

\_\_\_\_\_\_\_\_\_\_

setProperty()

getProperty()

<<interface>>

IEvtSelector

\_\_\_\_\_\_\_\_\_\_

setCriteria()

getIterator()

<<interface>>

ISelectorUI

\_\_\_\_\_\_\_\_\_\_

Illustration 8.1 The EventSelector class diagram

Event Selector

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9

Transient Data Store

A transient data store is a passive component which acts as the “logical” storage place for

transient data objects.

9.1 Purpose and Functionality . . . . . . . . . . . . . . . . 56

9.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 56

9.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 56

Transient Data Store

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9.1 Purpose and Functionality

We envisage several transient data stores within one application, each characterized by the lifetime

and nature of the contained data. For example, there is the Transient Event Data Store for event data,

the Transient Detector Data Store for detector, alignment and calibration data, and the Transient

Histogram Data Store for histograms and other “statistics based” objects.

A Transient Data Store is managed by a Data service, for example the Transient Event Data Store is

managed by the Transient Event Data Service (EventDataSvc). This service implements an interface

which is used by clients and in particular by Algorithms to access the data within the store. In order to

find required data it is assumed that a client knows how the data is organized, and identified and

obeys the relevant ownership conventions. Key issues related to transient stores are:

• Data Organization. The data within a data store is organized as tree, see Section 3.4.

• Data Identification. Any data object in the data store has an identifier, allowing it to be refered-to

by a client [Section 3.4].

• Data ownership. Data objects within a data store are owned by the data service that is managing

that store. In particular if a new data object is created by a client and registered into the store so as

to make it available to other algorithms then that client is no longer responsible for the deletion of

the object. Infact after registration they must not delete the object or change essential

characteristics such as the identification, etc..

• Lifetime. References to objects in the data stores are valid only during a specific (store

dependent) time span. For example, references to event data objects become invalid

immeadiately the next event is loaded.

9.2 Interfaces

The Transient Data Store does not offer any interface directly to clients. The interface is implemented

by the corresponding Data Service. Clients of a Transient Data Store are allowed to keep direct

references to objects in the store as long as the validity period and ownership conventions are obeyed.

9.3 Dependencies

Since the Transient Data Store is a passive component it does not need any other component of the

system to perform its function (storing data objects is memory).

Dependencies

GAUDI 57

Specific

Generic

Identifiable

Directory

<<interface>>

IClassInfo

DataObject

Event

RecEvent

EventTag

EcalHits EcalClusts

Hit Cluster

Illustration 9.1 The class diagram for the Data Objects in the store.

Transient Data Store

58 GAUDI

GAUDI 59

10

Event Data Service

The event data service manages the transient event data store. This component provides the

necessary functionality required by algorithms and the application manager to locate data

object within the transient store and to register new ones.

10.1 Purpose and Functionality . . . . . . . . . . . . . . . . 60

10.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 60

10.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 62

Event Data Service

60 GAUDI

10.1 Purpose and Functionality

The event data service manages the transient event data store. The service interacts mainly with two

components: Algorithms and the ApplicationMgr.

• The event data service is used by the Algorithms as an input/output channel for data objects. An

algorithm may request objects from the store, or register them into the store so that they are

available to other algorithms.

• The event data service delivers references to event data objects on request. If the requested

data objects are not present, the event data service asks the event persistency service to load

the required objects and then makes them availible to the algorithm.

• Once event data objects are registered to the event data service, the algorithm gives up

ownership. The event data service releases the objects on request of the application manager.

• Event data objects must be identifiable in order to be added to the data store.

• The registration of data must respect the tree structure of the transient store.

• The application manager tells the event data service which event to deal with in case of a request.

• Clients of the event data service can decide which data should be made persistent:

• Clients may decide to discard partially or completely the data objects managed by the service.

• The event data service must be able to deliver transient data objects to the services in charge

of creating other data representations like the persistency service or the service responsible

for creating graphical representations.

10.2 Interfaces

The EventDataSvc implements the following interfaces:

• Generic service interface (IService) for specific interaction like e.g. query the service name.

• Storage management (IDataManagerSvc): This interface supplies global management actions

on the transient data store. This interface is used by the ApplicationMgr. Through this interface

actions necessary to manipulate event related data globally, such as requests to load a new event,

discard the objects owned by the service etc. are handled. The interface also allows selection

collectors using selection agents to traverse through the data store.

• Data provider (IDataProviderSvc): The interface used by the Algorithms to request or register

event data objects.

Interfaces

GAUDI 61

IDataManagerSvc

<<Interface>>

IDataProviderSvc

<<Interface>>

IService

<<Interface>>

Service

<<Implementation>>

EventDataSvc

<<Implementation>>

IEventDataSvc

<<Interface>>

Specific interface

not existant

- for future extensions

IInterface

<<Interface>>

\_root

0..1

IRegistryEntry

<<Interface>>

\_dataLoader

0..1

IConversionSvc

<<Interface>>

DataSvc

<<Implementation>>

Generic data service

Transient

Data Store

Service to retrieve

nonexistant objects

Availible

Interfaces

IDataManagerSvc

setRoot (pRootObj : DataObject\*, top\_path : const string&) : StatusCode

setDataLoader (service : IPersistencySvc\*) : StatusCode

clearStore () : StatusCode

clearSubTree (sub\_tree\_path : const string&) : StatusCode

clearSubTree (pObject : DataObject\*) : StatusCode

traverseTree (pSelector : ISelectionAgent\*) : StatusCode

traverseSubTree (sub\_tree\_path : const string&, pSelector : ISelectionAgent\*) : StatusCode

traverseSubTree (pObject : DataObject\*, pSelector : ISelectionAgent\*) : StatusCode

<<Interface>>

IDataProviderSvc

retrieveObject (full\_path : const string&, refpObject : DataObject\*&) : StatusCode

retrieveObject (root\_obj : DataObject\*, refpObject : DataObject\*&) : StatusCode

registerObject (root\_path : const string&, obj : DataObject\*) : StatusCode

registerObject (root\_obj : DataObject\*, obj : DataObject\*) : StatusCode

unregisterObject (path : const string&) : StatusCode

unregisterObject (obj : DataObject\*) : StatusCode

findObject (full\_path : const string&, pRefObject : DataObject\*&) : StatusCode

findObject (pNode : DataObject\*, leaf\_name : const string&, pRefObject : DataObject\*&) : StatusCode

<<Interface>>

Illustration 10.1 The EventDataSvc class diagram and the provisional defintion of the interfaces.

Event Data Service

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10.3 Dependencies

The EventDataSvc depends on the following services provided by other components of the

architecture :

• The generic service (Service) implementation which defines basic properties and abilities of any

service.

• Job options service (JobOptionsSvc). The JobOptionsSvc service provides to the EventDataSvc

the new values for the its properties in case the user would like to overwrite the default ones. The

implementation of the event data service only depends on the interface of the job option service.

• Message service (MessageSvc). The EventDataSvc uses the MessageSvc to report errors and

informational messages to the end user. The implementation of the event data service only

depends on the interface of the message service.

• Event persistency service (EvtPersistencySvc). The EventDataSvc uses the persistency service to

create transient objects on demand. The implementation of the event data service only depends on

the interface of the persistency service.

• Data selection agents (ISelectionAgent). Data selector agents are used to traverse the data store in

order to analyse the content e.g. to collect references to objects which should be passed to other

services.

GAUDI 63

11

Event Persistency Service

The event persistency service delivers data objects from a persistent store to the transient

data store and vice versa. The persistency service collaborates with the event data service to

provide the data requested by an algorithm in the case that the data is not yet in the transient

store. This service requires the help of specific converters which actually perform the

conversion of data objects between their transient and persistent representations.

11.1 Purpose and Functionality . . . . . . . . . . . . . . . . 64

11.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 64

11.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 66

Event Persistency Service

64 GAUDI

11.1 Purpose and Functionality

The purpose of the event persistency service (EvtPersistencySvc) is the extraction of persistent

objects from the persistent data store and their conversion to the appropriate transient types, and the

inverse process.

The creation of a transient object proceeds as follows:

• given an identifier, the service locates the object in the persistent world,

• the appropriate Converter for this type is selected,

• the persistency service invokes the converter and finally

• delivers the requested transient object to the client.

The object identifier needs only to be interpreted by the Converter, it is not needed anywhere outside

the converter.

If it is known in advance that not a single object, but instead a complete tree or part of a tree of data is

required, then the service can optimize the procedure. For example, sub-trees or a list of objects

required in every event may be specified to the persistency service and the objects “pre-loaded”

before they are requested by an algorithm.

To populate the persistent data store is slightly different:

• the persistency service is given transient objects,

• it finds the proper converter for the received object,

• it invokes the object conversion using this converter and

• stores the persistent object.,

Converters being able to create persistent representations must be assigned to the service either one

by one or in the form of a factory.

Converters are declared to the EvtPersistencySvc at run-time and therefore they need to implement a

common interface. The Converters know about the mechanism to retrieve persistent objects (e.g.

from ZEBRA, Objy,...) and to create their transient representation and vice-versa. Identifying which

Converter is able to convert a specific instance is achieved by associating each Converter to a unique

run-time independent class identifier.

11.2 Interfaces

The EvtPersistencySvc provides the following interfaces:

• Generic service interface (IService) for interactions such as querying the service name.

• Generic data conversion interface (IConversionSvc). This interface is capable to accept

converters or a converter factory necessary to create persistent event data representations. This

interface also accepts data selectors which tell the service which objects have to be created,

converted or updated.

• Persistency specific interface (IPersistencySvc). This interface will handle - if needed - specific

interactions with the persistent store.

Interfaces

GAUDI 65

IService

<<Interface>>

IInterface

<<Interface>>

Service

<<Implementation>

IPersistencySvc

<<Interface>>

\_converter

1..1

IConverter

<<Interface>>

1..1

\_type

Class

<<Implementation>>

ConversionSvc

<<Implementation>

\_knownConverters

0..\*

ListEntry

<<struct>>

For later

improved

functionality

PersistentSvc

<<Implementation>

Service

Dispatcher

Workers responsible

for different database

technologies

\_dataServices

0..\*

IConversionSvc

<<Interface>>

EvtPersistencySvc

<<Implementation>

Availible

Interfaces

Extension Interface

IConversionSvc

initialize () : StatusCode

stop () : StatusCode

addConverter (pConverter : IConverter\*) : StatusCode

removeConverter (pConverter : IConverter\*) : StatusCode

createObj (pAddress : IOpaqueAddress\*, refpObject : DataObject\*&) : StatusCode

updateObj (pAddress : IOpaqueAddress\*) : StatusCode

updateReps (pSelector : IDataSelector\*) : StatusCode

createReps (pSelector : IDataSelector\*) : StatusCode

<<Interface>>

Illustration 11.1 The EvtPersistencySvc and the provisional interface.

Event Persistency Service

66 GAUDI

11.3 Dependencies

The EvtPersistencySvc depends on the following services provided by other components of the

architecture:

• The generic service (Service) implementation which defines basic properties and abilities of any

service.

• Job options service (JobOptionsSvc). The JobOptionsSvc service provides to the

EvtPersistencySvc the new values for the its properties in case the user would like to overwrite

the default ones. The implementation of the event data persistency service only depends on the

interface of the job option service.

• Message service (MessageSvc). The EvtPersistencySvc uses the MessageSvc to report errors and

informational messages to the end user. The implementation of the event data persistency service

only depends on the interface of the message service.

• Event data service (EventDataSvc). The EvtPersistencySvc collaborates very closely with the

DetPersistencySvc to load or update detector objects in to store. The implementation of the event

data persistency service only depends on the interfaces of the data service.

• Data item selectors (DataItemSelector). If persistent data must be updated or new persistent

objects must be created an object selection is passed to the service in form of a selected item

collection. The service will retrieve all selected items from the selector.

GAUDI 67

12

Detector Data Service

The detector data service manages the transient detector data store. This component is very

similar to the event data service with regards to the retrieval and registration of data objects.

However in addition it is responsible for the management of such things as the

synchronization of detector information to the current event.

12.1 Purpose and Functionality . . . . . . . . . . . . . . . . 68

12.2 Interfaces . . . . . . . . . . . . . . . . . . . . . . . . . 70

12.3 Dependencies . . . . . . . . . . . . . . . . . . . . . . . 70

Detector Data Service

68 GAUDI

12.1 Purpose and Functionality

The detector data service manages the transient detector data store. The service interacts with several

other components: the application manager, algorithms and event data converters whenever event

data structures have references to detector data.

Besides providing requested data, the detector data service also has to check the validity of the data

since detector data are not “static” over the entire lifetime of a job. For example calibration constants

will change with time and the set of constants which is valid for the first events in the job may not be

valid for last events. Hence the detector data service must be able to distinguish between valid and

invalid data with respect to a given event.

Invalid data may be discarded or updated, i.e. given a valid time stamp the detector data service must:

• direct new detector data requests to the proper, valid data objects.

• request the loading of up-to-date detector data objects if they are not present in the store.

Algorithms will initialize references to detector data at configuration time. These references must stay

valid over the analyzed event range and so the objects will have to be updated rather than recreated.

This means, that the detector data service is not stateless. It will have to be validated for every event

ensuring that the contained references are valid. In order to optimize data validity the detector data

objects which should automatically be updated must be marked.

• The detector data service is used by the algorithms as an input/output channel for detector data

objects:

• The detector data service delivers references to detector data objects on request. If the

requested data objects are not present, the detector data service asks the detector persistency

service to deliver the objects and makes them available to the algorithm.

• Detector data objects intended to be available to (other) algorithms must be registered to the

detector data service.

• Once detector data objects are registered to the detector data service, the algorithm gives up

ownership. The detector data service releases the objects at the request of the application

manager.

• Detector data objects must be identifiable in order to be added to the data store.

• The registration of data must follow the hierarchy of the detector data objects.

• Clients of the detector data service can decide which data should be made persistent:

• Clients may decide to discard partially or completely the data objects managed by the service.

FAFSA

July 1, 2014 – June 30, 2015

F R E E A P P L I C AT I O N f o r F E D E R A L S T U D E N T A I D

Using Your Tax Return

Filling Out the FAFSA

SM

If you or your family experienced significant changes to your financial situation (such as

loss of employment), complete this form to the extent you can and submit it as instructed.

Consult with the financial aid office at the college(s) you applied to or plan to attend.

For help in filling out the FAFSA, go to www.studentaid.gov/completefafsa or call

1-800-4-FED-AID (1-800-433-3243). TTY users (for the hearing impaired) may call

1-800-730-8913.

Fill the answer fields directly on your screen or print the form and complete it by hand.

Your answers will be read electronically; therefore if you complete the form by hand:

tuse black ink and fill in circles completely:

tprint clearly in CAPITAL letters and skip a

box between words:

treport dollar amounts (such as $12,356.41)

like this:

Check with your financial aid administrator for these states

and territories:

AL, AS \*, AZ, CO, FM \*, GA, GU \*, HI \*, MH \*, MP \*, NE, NM, NV \*,

PR, PW \*, SD \*, TX, UT, VA \*, VI \*, WI and WY \*.

Pay attention to the symbols that may be listed after

your state deadline

Blue is for student information and purple is for parent information.

Mailing Your FAFSA

After you complete this application, make a copy of pages 3 through 8 for your records.

Then mail the original of pages 3 through 8 to:

Federal Student Aid Programs, P.O. Box 4692, Mt. Vernon, IL 62864-4692.

After your application is processed, you will receive a summary of your information in

your Student Aid Report (SAR). If you provide an e-mail address, your SAR will be sent by

e-mail within three to five days. If you do not provide an e-mail address, your SAR will be

mailed to you within three weeks. If you would like to check the status of your FAFSA,

go to www.fafsa.gov or call 1-800-4-FED-AID.

Let’s Get Started!

Now go to page 3 of the application form and begin filling it out. Refer to the

notes as instructed.

AK Education Grant and AK Performance Scholarship June 30, 2014

Academic Challenge - June 1, 2014 (date received)

Workforce Grant - Contact the financial aid office.

Higher Education Opportunity Grant - June 1, 2014 (date

received)

Initial awards - March 2, 2014 + \*

Additional community college awards - September 2, 2014

(date postmarked) + \*

February 15, 2014 (date received) # \*

April 1, 2014 (date received) \* For priority consideration,

submit application by April 30, 2014.

For DCTAG, complete the DC OneApp and submit additional

supporting documents on or before April 30, 2014.

April 15, 2014 (date received)

May 15, 2014 (date processed)

July 1, 2014 (date received); earlier priority deadlines may

exist for certain programs. \*

Opportunity Grant - March 1, 2014 (date received) # \*

As soon as possible after January 1, 2014. Awards made until

funds are depleted.

March 10, 2014 (date received)

April 1, 2014 (date received) # \*

As soon as possible after January 1, 2014. Awards made until

funds are depleted.

June 30, 2015 (July 1, 2014 recommended)

May 1, 2014 (date received) #

March 1, 2014 (date received)

May 1, 2014 (date received)

March 1, 2014 (date received)

30 days after term starts (date received)

April 1, 2014 (date received)

MTAG and MESG Grants - September 15, 2014 (date received)

HELP Scholarship - March 31, 2014 (date received)

March 1, 2014 (date received) #

As soon as possible after January 1, 2014. Awards made until

funds are depleted.

April 15, 2014 (date received) # Early priority deadlines may

exist for institutional programs.

NH is not offering a state grant this year.

2013-2014 Tuition Aid Grant recipients - June 1, 2014 (date

received)

All other applicants

- October 1, 2014, fall & spring terms (date received)

- March 1, 2015, spring term only (date received)

June 30, 2015 (date received) \*

October 1, 2014 (date received)

March 1, 2014 (date received) #

OSAC Private Scholarships - March 1, 2014

Oregon Opportunity Grant - February 1, 2014

All first-time applicants at a community college; a business/

trade/technical school; a hospital school of nursing; or

enrolled in a non-transferable two-year program August 1, 2014 (date received)

All other applicants - May 1, 2014 (date received)

March 1, 2014 (date received) #

Tuition Grants - June 30, 2014 (date received)

SC Commission on Higher Education Need-based Grants - As

soon as possible after January 1, 2014. Awards made until

funds are depleted.

State Grant - Prior-year recipients receive award if eligible and

apply by March 1, 2014. All other awards made to neediest

applicants who apply by March 1, 2014, until funds are

depleted.

State Lottery - fall term, September 1, 2014 (date received);

spring & summer terms, February 1, 2015 (date received)

As soon as possible after January 1, 2014. Awards made

until funds are depleted. \*

As soon as possible after January 1, 2014. Awards made until

funds are depleted.

PROMISE Scholarship - March 1, 2014. New applicants must

also submit additional application at www.cfwv.com. Contact

your financial aid administrator or your state agency.

WV Higher Education Grant Program - April 15, 2014

# For priority consideration, submit application by date specified.

+ Applicants encouraged to obtain proof of mailing.

\* Additional form may be required.

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STATE AID DEADLINES

We recommend that you complete and submit your FAFSA as soon as possible on or

after January 1, 2014. If you (or your parents) need to file a 2013 income tax return with

the Internal Revenue Service (IRS), and have not done so yet, you can submit your FAFSA

now using estimated tax information, and then you must correct that information after

you file your return.

The easiest way to complete or correct your FAFSA with accurate tax information is by

using the IRS Data Retrieval Tool through www.fafsa.gov. In a few simple steps, most

students and parents who filed a 2013 tax return can view and transfer their tax return

information directly into their FAFSA.

Note: Both parents or both the student and spouse may need to report income

information on the FAFSA if they did not file a joint tax return for 2013. For assistance with

answering the income information questions in this situation, call 1-800-4-FED-AID.

APPLICATION DEADLINES

Federal Aid Deadline - June 30, 2015

State Aid Deadlines - See below.

Notes for question 8 (page 3)

Enter your Social Security Number (SSN). If you are a resident of the

Freely Associated States (i.e., the Republic of Palau, the Republic of the

Marshall Islands, or the Federated States of Micronesia) and were issued

an identification number beginning with “666” when submitting a FAFSA

previously, enter that number here. If you are a first-time applicant from

the Freely Associated States, enter “666” in the first three boxes of the

SSN field and leave the remaining six positions blank and we will create

an identification number to be used for federal student aid purposes.

Notes for questions 14 and 15 (page 3)

If you are an eligible noncitizen, write in your eight- or nine-digit Alien

Registration Number. Generally, you are an eligible noncitizen if you are

(1) a permanent U.S. resident with a Permanent Resident Card (I-551); (2)

a conditional permanent resident with a Conditional Green Card (I-551C);

(3) the holder of an Arrival-Departure Record (I-94) from the Department

of Homeland Security showing any one of the following designations:

“Refugee,” “Asylum Granted,” “Parolee” (I-94 confirms that you were

paroled for a minimum of one year and status has not expired), T-Visa

holder (T-1, T-2, T-3, etc.) or “Cuban-Haitian Entrant;” or (4) the holder of a

valid certification or eligibility letter from the Department of Health and

Human Services showing a designation of “Victim of human trafficking.”

If you are in the U.S. on an F1 or F2 student visa, a J1 or J2 exchange

visitor visa, or a G series visa (pertaining to international organizations),

select “No, I am not a citizen or eligible noncitizen.” You will not be

eligible for federal student aid. If you have a Social Security Number but

are not a citizen or an eligible noncitizen, you should still complete the

FAFSA because you may be eligible for state or college aid.

Notes for questions 16 and 17 (page 3)

Report your marital status as of the date you sign your FAFSA. If your

marital status changes after you sign your FAFSA, check with the

financial aid office at the college. Consistent with the Supreme Court

decision IPMEJOH 4FDUJPO PG the Defense of Marriage Act (DOMA)

VODPOTUJUVUJPOBM, same-sex couples must report their marital status as

married if they were legally married in a state or other jurisdiction

(foreign country) that permits same-sex marriage

XJUIPVU SFHBSE UP

XIFSFUIFDPVQMFSFTJEFT.

Notes for question 22 (page 3)

The Selective Service System, and the registration requirement for young

men, preserves America’s ability to provide manpower in an emergency

to the U.S. Armed Forces (Army, Navy, Air Force, Marines or Coast

Guard). Almost all men—ages 18 through 25—must register. For more

information about Selective Service, visit www.sss.gov.

Notes for questions 33 (page 4)

and 81 (page 6)

Notes for questions 42 and 43 (page 4), 45j (page 5),

and 91 and 92 (page 7)

Net worth means current value minus debt. If net worth is negative, enter 0.

Investments include real estate (do not include the home in which you

live), rental property (includes a unit within a family home that has its

own entrance, kitchen, and bath rented to someone other than a family

member), trust funds, UGMA and UTMA accounts, money market funds,

mutual funds, certificates of deposit, stocks, stock options, bonds, other

securities, installment and land sale contracts (including mortgages

held), commodities, etc.

Investments also include qualified educational benefits or education

savings accounts (e.g., Coverdell savings accounts, 529 college savings

plans and the refund value of 529 prepaid tuition plans). For a student

who does not report parental information, the accounts owned by the

student (and/or the student’s spouse) are reported as student investments

in question 42. For a student who must report parental information, the

accounts are reported as parental investments in question 91, including

all accounts owned by the student and all accounts owned by the parents

for any member of the household.

Money received, or paid on your behalf, also includes distributions to

you (the student beneficiary) from a 529 plan that is owned by someone

other than you or your parents (such as your grandparents, aunts, and

uncles). You must include these distribution amounts in question 45j.

Investments do not include the home you live in, the value of life

insurance, retirement plans (401[k] plans, pension funds, annuities, noneducation IRAs, Keogh plans, etc.) or cash, savings and checking accounts

already reported in questions 41 and 90.

Investments also do not include UGMA and UTMA accounts for which

you are the custodian, but not the owner.

Investment value means the current balance or market value of these

investments as of today. Investment debt means only those debts that

are related to the investments.

Business and/or investment farm value includes the market value of

land, buildings, machinery, equipment, inventory, etc. Business and/or

investment farm debt means only those debts for which the business or

investment farm was used as collateral.

Business value does not include the value of a small business if your

family owns and controls more than 50 percent of the business and the

business has 100 or fewer full-time or full-time equivalent employees.

For small business value, your family includes (1) persons directly related

to you, such as a parent, sister or cousin, or (2) persons who are or were

related to you by marriage, such as a spouse, stepparent or sister-in-law.

Investment farm value does not include the value of a family farm that

you (your spouse and/or your parents) live on and operate.

If you filed or will file a foreign tax return, a tax return with Puerto Rico,

another U.S. territory (e.g., Guam, American Samoa, the U.S. Virgin

Islands, Swain’s Island or the Northern Marianas Islands) or one of the

Freely Associated States, use the information from that return to fill out

this form. If you filed a foreign return, convert all monetary units to U.S.

dollars, using the exchange rate that is in effect today. To view the daily

exchange rate, go to www.federalreserve.gov/releases/h10/current.

Notes for question 49 (page 5)

Notes for questions 35 (page 4)

and 83 (page 6)

Notes for question 50 (page 5)

In general, a person is eligible to file a 1040A or 1040EZ if he or she makes less

than $100,000, does not itemize deductions, does not receive income from

his or her own business or farm and does not receive alimony. A person is

not eligible to file a 1040A or 1040EZ if he or she makes $100,000 or more,

itemizes deductions, receives income from his or her own business or farm,

is self-employed, receives alimony or is required to file Schedule D for capital

gains. If you filed a 1040 only to claim the American Opportunity Tax Credit or

Lifetime Learning Tax Credit, and you would have otherwise been eligible to

file a 1040A or 1040EZ, answer “Yes” to this question. If you filed a 1040 and

were not required to file a tax return, answer “Yes” to this question.

Notes for questions 38 (page 4)

and 87 (page 7) — Notes for those who filed a 1040EZ

On the 1040EZ, if a person didn’t check either box on line 5, enter 01 if he or

she is single or has never been married, or 02 if he or she is married. If a person

checked either the “you” or “spouse” box on line 5, use 1040EZ worksheet line

F to determine the number of exemptions ($3,800 equals one exemption).

Page 2

Answer “Yes” if you are currently serving in the U.S. Armed Forces or are

a National Guard or Reserves enlistee who is on active duty for other than

state or training purposes.

Answer “No” if you are a National Guard or Reserves enlistee who is on

active duty for state or training purposes.

Answer “Yes” (you are a veteran) if you (1) have engaged in active duty

(including basic training) in the U.S. Armed Forces, or are a National

Guard or Reserves enlistee who was called to active duty for other than

state or training purposes, or were a cadet or midshipman at one of the

service academies, and (2) were released under a condition other than

dishonorable. Also answer “Yes” if you are not a veteran now but will be

one by June 30, 2015.

Answer “No” (you are not a veteran) if you (1) have never engaged in

active duty (including basic training) in the U.S. Armed Forces, (2)

are currently an ROTC student or a cadet or midshipman at a service

academy, (3) are a National Guard or Reserves enlistee activated only for

state or training purposes, or (4) were engaged in active duty in the U.S.

Armed Forces but released under dishonorable conditions.

Also answer “No” if you are currently serving in the U.S. Armed Forces

and will continue to serve through June 30, 2015.

Notes continued on page 9.

FAFSA

July 1, 2014 – June 30, 2015

SM

F R E E A P P L I C AT I O N f o r F E D E R A L S T U D E N T A I D

Step One (Student): For questions 1-31, leave blank any questions that do not apply to you (the student).

OMB # 1845-0001

Your full name (exactly as it appears on your Social Security card) If your name has a suffix, such as Jr. or III, include a space between your last name and suffix.

1. Last name : Smith

2. First name : Alex

3. Middle initial

Your mailing address

4. Number and street : 10th Floor, 100 South Main Street

(include apt. number)

5. City (and country if not U.S.) : , Los Angeles

6. State : California

7. ZIP code : 90012

8. Your Social Security Number : 576-55-4600

9. Your date of birth : 01/02/1992

10. Your permanent telephone number : +1-888-452-1505

Your driver’s license number and driver’s license state (if you have one)

11. Driver’s license number : 123TH5845

12. Driver’s license state : California

13.Your e-mail address. If you provide your e-mail address, we will communicate with you electronically. For example, when your FAFSA has been processed, you will be

notified by e-mail. Your e-mail address will also be shared with your state and the colleges listed on your FAFSA to allow them to communicate with you. If you do not

have an e-mail address, leave this field blank.

email : lex@gmail.com

14. Are you a U.S.citizen? Yes

15. Alien Registration Number:

16. What is your marital status as of today? Unmarried

17. Month and year you were

married, remarried, separated,

divorced or widowed.

18. What is your state of legal residence : California

21. Are you male or female : Male

19. Did you become a legal resident of this state before January 1, 2009 : Yes

20. If the answer to question 19 is “No,” give month and year you

became a legal resident.

22. If female, skip to question

23. Most male students must register with Selective Service to receive federal aid. If you are male, age 18-25 and not registered, fill in the circle and we will register you. See Notes page 2.

23. Have you been convicted for the possession or sale of illegal drugs for an offense that occurred while you were receiving

federal student aid (such as grants, loans or work-study)?

Answer “No” if you have never received federal student aid or if you have never had a drug conviction for an offense that occurred while

receiving federal student aid. If you have a drug conviction for an offense that occurred while you were receiving federal student aid, answer

“Yes,” but complete and submit this application, and we will mail you a worksheet to help you determine if your conviction affects your

eligibility for aid. If you are unsure how to answer this question, call 1-800-433-3243 for help.

24. Highest school completed by Parent 1

1. Middle school/Jr. high : Stanford school

2. High school : Stanford school

3. College or beyond : Oxford University

25. Highest school completed by Parent 2

1 Middle school/Jr. high : Stanford school

2 High school : Stanford school

3 College or beyond : Stanford University

26. When you begin college in the 2014-2015 school year, what will be your high school completion status?

High school diploma. Answer question 27. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

1 Homeschooled. Skip to question 28. . . . . . . . . . .

3 General Educational Development (GED) certificate or state equivalent test. Skip to question

28.

For Help — www.studentaid.gov/completefafsa

Page 3

Step One CONTINUED on page 4

Step One CONTINUED from page 3

28. Will you have your first bachelor’s degree

before July 1, 2014?

27. What is the name of the high school where you received or will receive your high school diploma?

Enter the complete high school name, and the city and state where the high school is located.

STATE

High School Name

Yes

High School City

29. When you begin the 2014-2015 school year, what will be your grade

level?

1

No

2

30. When you begin the 2014-2015 school year, what degree or certificate will

you be working on?

Never attended college and 1st year undergraduate . . . . . . . . . . . . .

1st bachelor’s degree . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Attended college before and 1st year undergraduate . . . . . . . . . . . .

2nd bachelor’s degree . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

2nd year undergraduate/sophomore . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Associate degree (occupational or technical program) . . . . . . . . . . . . . . . . . . . . .

Associate degree (general education or transfer program). . . . . . . . . . . . . . . . . .

3rd year undergraduate/junior . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

4th year undergraduate/senior . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

5th year/other undergraduate. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

1st year graduate/professional . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Continuing graduate/professional or beyond . . . . . . . . . . . . . . . . . . . .

Certificate or diploma (occupational, technical or education program

of less than two years). . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Certificate or diploma (occupational, technical or education program

of two or more years) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Teaching credential (nondegree program) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Graduate or professional degree . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Other/undecided . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

31. Are you interested in being considered for work-study?

Step Two (Student):

Answer questions 32–58 about yourself (the student). If you were never married or are separated, divorced

or widowed, answer only about yourself. If you are married or remarried as of today, include information

about your spouse (husband or wife).

32. For 2013, have you (the student) completed

your IRS income tax return or another tax

return listed in question 33?

I have already completed my return . . . . . . . .

I will file but have not yet completed my

return . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

I’m not going to file. Skip to question 39.

33. What income tax return did you file or will you file

for 2013?

34. For 2013, what is or will be your tax filing

status according to your tax return?

IRS 1040 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

IRS 1040A or 1040EZ . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

A foreign tax return. See Notes page 2. . . . . . . . . . . .

A tax return with Puerto Rico, another U.S. territory,

or Freely Associated State. See Notes page 2. . . . . .

35. If you have filed or will file a 1040, were you eligible to file a 1040A or 1040EZ?

See Notes page 2.

4

Single . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Head of household. . . . . . . . . . . . . . . . . . .

Married—filed joint return . . . . . . . . . . .

Married—filed separate return . . . . . . .

Qualifying widow(er). . . . . . . . . . . . . . . . .

Don’t know . . . . . . . . . . . . . . . . . . . . . . . . . .

Yes

1

No

2

Don’t know

For questions 36–45, if the answer is zero or the question does not apply to you, enter 0. Report whole dollar amounts with no cents.

36. What was your (and spouse’s) adjusted gross income for 2013? Adjusted gross income is on IRS Form 1040—line 37;

$

1040A—line 21; or 1040EZ—line 4.

37. Enter your (and spouse’s) income tax for 2013. Income tax amount is on IRS Form 1040—line 55; 1040A—line 35; or $

1040EZ—line 10.

,

38. Enter your (and spouse’s) exemptions for 2013. Exemptions are on IRS Form 1040—line 6d or Form 1040A—line 6d.

For Form 1040EZ, see Notes page 2.

Questions 39 and 40 ask about earnings (wages, salaries, tips, etc.) in 2013. Answer the questions whether or not a tax return was filed. This

information may be on the W-2 forms, or on IRS Form 1040—lines 7 + 12 + 18 + Box 14 (Code A) of IRS Schedule K-1 (Form 1065); on 1040A—line 7; or

on 1040EZ—line 1. If any individual earning item is negative, do not include that item in your calculation.

39. How much did you earn from working in 2013?

40. How much did your spouse earn from working in 2013?

$

,

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41. As of today, what is your (and spouse’s) total current balance of cash, savings and checking accounts? Don’t include

$

student financial aid.

42. As of today, what is the net worth of your (and spouse’s) investments, including real estate? Don’t include the home you

$

live in. Net worth means current value minus debt. See Notes page 2.

43. As of today, what is the net worth of your (and spouse’s) current businesses and/or investment farms? Don’t include a

$

family farm or family business with 100 or fewer full-time or full-time equivalent employees. See Notes page 2.

For Help — 1-800-433-3243

Page 4

Step Two CONTINUED on page 5

Step Two CONTINUED from page 4

44. Student’s 2013 Additional Financial Information (Enter the combined amounts for you and your spouse.)

a. Education credits (American Opportunity Tax Credit and Lifetime Learning Tax Credit) from IRS Form 1040—line 49 or 1040A—line 31.

$

b. Child support paid because of divorce or separation or as a result of a legal requirement. Don’t include support for children in your

household, as reported in question 95.

$

c. Taxable earnings from need-based employment programs, such as Federal Work-Study and need-based employment portions of

fellowships and assistantships.

$

,

,

d. Taxable student grant and scholarship aid reported to the IRS in your adjusted gross income. Includes AmeriCorps benefits (awards,

living allowances and interest accrual payments), as well as grant and scholarship portions of fellowships and assistantships.

$

,

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e. Combat pay or special combat pay. Only enter the amount that was taxable and included in your adjusted gross income. Don’t include

untaxed combat pay.

$

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,

f. Earnings from work under a cooperative education program offered by a college.

$

,

,

a. Payments to tax-deferred pension and retirement savings plans (paid directly or withheld from earnings), including, but not limited to,

amounts reported on the W-2 forms in Boxes 12a through 12d, codes D, E, F, G, H and S. Don’t include amounts reported in code DD

(employer contributions toward employee health benefits).

$

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,

b. IRA deductions and payments to self-employed SEP, SIMPLE, Keogh and other qualified plans from IRS Form 1040—line 28 + line 32

or 1040A—line 17.

$

,

,

c. Child support received for any of your children. Don’t include foster care or adoption payments.

$

,

,

d. Tax exempt interest income from IRS Form 1040—line 8b or 1040A—line 8b.

$

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,

e. Untaxed portions of IRA distributions from IRS Form 1040—lines (15a minus 15b) or 1040A—lines (11a minus 11b). Exclude rollovers.

If negative, enter a zero here.

$

,

,

f. Untaxed portions of pensions from IRS Form 1040—lines (16a minus 16b) or 1040A—lines (12a minus 12b). Exclude rollovers.

If negative, enter a zero here.

$

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$

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$

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$

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$

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45. Student’s 2013 Untaxed Income (Enter the combined amounts for you and your spouse.)

g. Housing, food and other living allowances paid to members of the military, clergy and others (including cash payments and cash value

of benefits). Don’t include the value of on-base military housing or the value of a basic military allowance for housing.

h. Veterans noneducation benefits, such as Disability, Death Pension, or Dependency & Indemnity Compensation (DIC) and/or VA

Educational Work-Study allowances.

i. Other untaxed income not reported in items 45a through 45h, such as workers’ compensation, disability, etc. Also include the untaxed

portions of health savings accounts from IRS Form 1040—line 25. Don’t include extended foster care benefits, student aid, earned

income credit, additional child tax credit, welfare payments, untaxed Social Security benefits, Supplemental Security Income, Workforce

Investment Act educational benefits, on-base military housing or a military housing allowance, combat pay, benefits from flexible

spending arrangements (e.g., cafeteria plans), foreign income exclusion or credit for federal tax on special fuels.

j. Money received, or paid on your behalf (e.g., bills), not reported elsewhere on this form. This includes money that you received from a

parentXIPTFGJOBODJBMJOGPSNBUJPOJTOPUSFQPSUFEPOUIJTGPSNBOEUIBUJTOPUpart of a legal child support agreement. See Notes page 2.

Step Three (Student):

Answer the questions in this step to determine if you will need to provide parental information. Once

you answer “Yes” to any of the questions in this step, skip Step Four and go to Step Five on page 8.

46. Were you born before January 1, 1991? . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Yes

1

No

2

47. As of today, are you married? (Also answer “Yes” if you are separated but not divorced.) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

48. At the beginning of the 2014-2015 school year, will you be working on a master’s or doctorate program (such as an MA,

MBA, MD, JD, PhD, EdD, graduate certificate, etc.)?. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

49. Are you currently serving on active duty in the U.S. Armed Forces for purposes other than training? See Notes page 2. . . . .

50. Are you a veteran of the U.S. Armed Forces? See Notes page 2. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Yes

1

No

2

Yes

1

No

2

Yes

1

No

2

Yes

1

No

2

Yes

1

No

2

Yes

1

No

2

Yes

1

No

2

54. As determined by a court in your state of legal residence, are you or were you an emancipated minor? See Notes page 9. . . . .

Yes

1

No

2

55. As determined by a court in your state of legal residence, are you or were you in legal guardianship? See Notes page 9. . . . .

Yes

1

No

2

56. At any time on or after July 1, 2013, did your high school or school district homeless liaison determine that you were an

unaccompanied youth who was homeless or were self-supporting and at risk of being homeless? See Notes page 9. . . . . . .

Yes

1

No

2

Yes

1

No

2

Yes

1

No

2

51. Do you now have or will you have children who will receive more than half of their support from you between July 1, 2014

and June 30, 2015?. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

52. Do you have dependents (other than your children or spouse) who live with you and who receive more than half of their

support from you, now and through June 30, 2015? . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

53. At any time since you turned age 13, were both your parents deceased, were you in foster care or were you a dependent

or ward of the court? See Notes page 9. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

57. At any time on or after July 1, 2013, did the director of an emergency shelter or transitional housing program funded by

the U.S. Department of Housing and Urban Development determine that you were an unaccompanied youth who was

homeless or were self-supporting and at risk of being homeless? See Notes page 9. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

58. At any time on or after July 1, 2013, did the director of a runaway or homeless youth basic center or transitional living

program determine that you were an unaccompanied youth who was homeless or were self-supporting and at risk of

being homeless? See Notes page 9. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

For Help — www.studentaid.gov/completefafsa

Page 5

If you (the student) answered “No” to every question in Step Three, go to Step Four.

If you answered “Yes” to any question in Step Three, skip Step Four and go to Step Five on page 8.

(Health professions students: Your college may require you to complete Step Four even if you answered “Yes” to any Step Three question.)

If you believe that you are unable to provide parental information, see Notes page 9.

Step Four (Parent): Complete this step if you (the student) answered “No” to all questions in Step Three.

Answer all the questions in Step Four even if you do not live with your legal parents (your biological and/or adoptive parents). Grandparents, foster parents, legal guardians,

aunts and uncles are not considered parents on this form unless they have legally adopted you. If your legal parents are married to each other or are not married to each

other and live together, answer the questions about both of them. If your parent was never married or is remarried, divorced, separated or widowed, see Notes page 9 for

additional instructions.

59. As of today, what is the marital status of your legal parents?

Never married. . . . . . . . . . . . . . . . . . . . . . . . .

2

Unmarried and both parents living

together. . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

5

Married or remarried. . . . . . . . . . . . . . . .

1

Divorced or separated. . . . . . . . . . . . . . .

3

Widowed . . . . . . . . . . . . . . . . . . . . . . . . . .

4

60. Month and year

they were married,

remarried, separated,

divorced or widowed.

MONTH

YEAR

What are the Social Security Numbers, names and dates of birth of the parents reporting information on this form?

If your parent does not have a Social Security Number, you must enter 000-00-0000. If the name includes a suffix, such as Jr. or III, include a space between the last name and

suffix. Enter two digits for each day and month (e.g., for May 31, enter 05 31).

Questions 61-64 are for Parent 1 (father/mother/stepparent)

61. SOCIAL SECURITY NUMBER

–

–

65. SOCIAL SECURITY NUMBER

1 9

,

Questions 65-68 are for Parent 2 (father/mother/stepparent)

–

63. FIRST INITIAL 64. DATE OF BIRTH

62. LAST NAME, AND

67. FIRST INITIAL 68. DATE OF BIRTH

66. LAST NAME, AND

–

1 9

,

69. Your parents’ e-mail address. If you provide your parents’ e-mail address, we will let them know your FAFSA has been processed. This e-mail address will

also be shared with your state and the colleges listed on your FAFSA to allow them to electronically communicate with your parents.

@

70. What is your

parents’ state of

legal residence?

STATE

71. Did your parents become

legal residents of this state

before January 1, 2009?

Yes

1

No

2

72. If the answer to question 71 is “No,” give the

month and year legal residency began for the

parent who has lived in the state the longest.

MONTH

YEAR

73. How many people are in your parents’ household?

Include:

t yourself, even if you don’t live with your parents,

t your parents,

t your parents’ other children if (a) your parents will provide more than half of their support between July 1, 2014 and June 30, 2015, or

(b) the children could answer “No” to every question in Step Three on page 5 of this form, and

t other people if they now live with your parents, your parents provide more than half of their support and your parents will continue to

provide more than half of their support between July 1, 2014 and June 30, 2015.

74. How many people in your parents’ household (from question 73) will be college students between July 1, 2014 and June 30, 2015?

Always count yourself as a college student. Do not include your parents. You may include others only if they will attend, at least half-time in

2014-2015, a program that leads to a college degree or certificate.

In 2012 or 2013, did you, your parents or anyone in your parents’ household (from question 73) receive benefits from any of the federal programs listed?

Mark all that apply. Answering these questions will not reduce eligibility for student aid or these programs. TANF may have a different name in your parents’ state. Call

1-800-4-FED-AID to find out the name of the state’s program.

75. Supplemental

Security

Income (SSI)

76. Supplemental

Nutrition Assistance

Program (SNAP)

77. Free or

Reduced

Price Lunch

78. Temporary Assistance

for Needy Families

(TANF)

79. Special Supplemental Nutrition

Program for Women, Infants,

and Children (WIC)

\*GZPVSBOTXFSUPRVFTUJPOXBTi6ONBSSJFEBOECPUIQBSFOUTMJWJOHUPHFUIFS

wDPOUBDU'&%"\*%GPSBTTJTUBODFXJUIBOTXFSJOHRVFTUJPOT

80. For 2013, have your parents completed their IRS

income tax return or another tax return listed in

question 81?

My parents have already completed their return. . .

My parents will file but have not yet completed

their return . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

My parents are not going to file.

Skip to question 88. . . . . . . . . . . . . . . . . . . . . . . . . . . . .

83. If your parents have filed or will file a 1040,

were they eligible to file a 1040A or 1040EZ?

See Notes page 2.

For Help — 1-800-433-3243

81. What income tax return did your

parents file or will they file for 2013?

1

2

3

82. For 2013, what is or will be your parents’ tax

filing status according to their tax return?

IRS 1040 . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

1

IRS 1040A or 1040EZ . . . . . . . . . . . . . . . . . . . . . . . .

2

A foreign tax return. See Notes page 2. . . . . .

3

A tax return with Puerto Rico, another U.S.

territory or Freely Associated State.

See Notes page 2. . . . . . . . . . . . . . . . . . . . . . . . . .

4

Yes

1

No

2

Don’t know

3

Page 6

Single . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

Head of household. . . . . . . . . . . . . . . . . . .

Married—filed joint return . . . . . . . . . . .

Married—filed separate return . . . . . . .

Qualifying widow(er). . . . . . . . . . . . . . . . .

Don’t know . . . . . . . . . . . . . . . . . . . . . . . . . .

84. As of today, is either of your parents a

dislocated worker? See Notes page 9.

1

4

2

3

5

6

Yes

1

No

2

Don’t know

3

Step Four CONTINUED on page 7

Step Four CONTINUED from page 6

For questions 85–94, if the answer is zero or the question does not apply, enter 0. Report whole dollar amounts with no cents.

85. What was your parents’ adjusted gross income for 2013? Adjusted gross income is on IRS Form 1040—line 37;

1040A—line 21; or 1040EZ—line 4.

$

,

,

86. Enter your parents’ income tax for 2013. Income tax amount is on IRS Form 1040—line 55; 1040A—line 35; or

1040EZ—line 10.

$

,

,

87. Enter your parents’ exemptions for 2013. Exemptions are on IRS Form 1040—line 6d or on Form 1040A—line 6d.

For Form 1040EZ, see Notes page 2.

Questions 88 and 89 ask about earnings (wages, salaries, tips, etc.) in 2013. Answer the questions whether or not a tax return was filed. This information may be on the W-2

forms, or on IRS Form 1040—lines 7 + 12 + 18 + Box 14 (Code A) of IRS Schedule K-1 (Form 1065); on 1040A—line 7; or on 1040EZ—line 1. If any individual earning item is

negative, do not include that item in your calculation.

88. How much did Parent 1 (father/mother/stepparent) earn from working in 2013?

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89. How much did Parent 2 (father/mother/stepparent) earn from working in 2013?

$

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90. As of today, what is your parents’ total current balance of cash, savings and checking accounts?

$

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,

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91. As of today, what is the net worth of your parents’ investments, including real estate? Don’t include the home in which

$

your parents live. Net worth means current value minus debt. See Notes page 2.

92. As of today, what is the net worth of your parents’ current businesses and/or investment farms? Don’t include a family

$

farm or family business with 100 or fewer full-time or full-time equivalent employees. See Notes page 2.

93. Parents’ 2013 Additional Financial Information (Enter the amounts for your parent[s].)

a. Education credits (American Opportunity Tax Credit and Lifetime Learning Tax Credit) from IRS Form 1040—line 49 or 1040A—

line 31.

$

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b. Child support paid because of divorce or separation or as a result of a legal requirement. Don’t include support for children in your

parents’ household, as reported in question 73.

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c. Your parents’ taxable earnings from need-based employment programs, such as Federal Work-Study and need-based employment

portions of fellowships and assistantships.

$

d. Your parents’ taxable student grant and scholarship aid reported to the IRS in your parents’ adjusted gross income. Includes

AmeriCorps benefits (awards, living allowances and interest accrual payments), as well as grant and scholarship portions of fellowships

and assistantships.

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e. Combat pay or special combat pay. Only enter the amount that was taxable and included in your parents’ adjusted gross income.

Do not enter untaxed combat pay.

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f. Earnings from work under a cooperative education program offered by a college.

$

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,

a. Payments to tax-deferred pension and retirement savings plans (paid directly or withheld from earnings), including, but not limited to,

amounts reported on the W-2 forms in Boxes 12a through 12d, codes D, E, F, G, H and S. Don’t include amounts reported in code DD

(employer contributions toward employee health benefits).

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b. IRA deductions and payments to self-employed SEP, SIMPLE, Keogh and other qualified plans from IRS Form 1040—line 28 + line 32 or

1040A—line 17.

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c. Child support received for any of your parents’ children. Don’t include foster care or adoption payments.

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d. Tax exempt interest income from IRS Form 1040—line 8b or 1040A—line 8b.

$

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e. Untaxed portions of IRA distributions from IRS Form 1040—lines (15a minus 15b) or 1040A—lines (11a minus 11b). Exclude rollovers.

If negative, enter a zero here.

$

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f. Untaxed portions of pensions from IRS Form 1040—lines (16a minus 16b) or 1040A—lines (12a minus 12b). Exclude rollovers.

If negative, enter a zero here.

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g. Housing, food and other living allowances paid to members of the military, clergy and others (including cash payments and cash value

of benefits). Don’t include the value of on-base military housing or the value of a basic military allowance for housing.

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h. Veterans noneducation benefits, such as Disability, Death Pension, or Dependency & Indemnity Compensation (DIC) and/or VA

Educational Work-Study allowances.

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94. Parents’ 2013 Untaxed Income (Enter the amounts for your parent[s].)

i. Other untaxed income not reported in items 94a through 94h, such as workers’ compensation, disability, etc. Also include the untaxed

portions of health savings accounts from IRS Form 1040—line 25. Don’t include extended foster care benefits, student aid, earned

income credit, additional child tax credit, welfare payments, untaxed Social Security benefits, Supplemental Security Income, Workforce

Investment Act educational benefits, on-base military housing or a military housing allowance, combat pay, benefits from flexible

spending arrangements (e.g., cafeteria plans), foreign income exclusion or credit for federal tax on special fuels.

For Help — www.studentaid.gov/completefafsa

Page 7

Step Five (Student): Complete this step only if you (the student) answered “Yes” to any questions in Step Three.

95. How many people are in your household?

Include:

t yourself (and your spouse),

t your children, if you will provide more than half of their support between July 1, 2014 and June 30, 2015, and

t other people if they now live with you, you provide more than half of their support and you will continue to provide more than half of their

support between July 1, 2014 and June 30, 2015.

96. How many people in your (and your spouse’s) household (from question 95) will be college students between July 1, 2014 and

June 30, 2015? Always count yourself as a college student. Include others only if they will attend, at least half-time in 2014-2015, a program that

leads to a college degree or certificate.

In 2012 or 2013, did you (or your spouse) or anyone in your household (from question 95) receive benefits from any of the federal programs listed?

Mark all that apply. Answering these questions will not reduce eligibility for student aid or these programs. TANF may have a different name in your state. Call

1-800-4-FED-AID to find out the name of the state’s program.

97. Supplemental

Security

Income (SSI)

98. Supplemental

Nutrition Assistance

Program (SNAP)

99. Free or

Reduced

Price Lunch

100. Temporary Assistance

for Needy Families

(TANF)

102. As of today, are you (or your spouse) a dislocated worker? See Notes page 9.

101. Special Supplemental Nutrition

Program for Women, Infants,

and Children (WIC)

Yes

1

No

Don’t know

2

3

Step Six (Student): Indicate which colleges you want to receive your FAFSA information.

Enter the six-digit federal school code and your housing plans. You can find the school codes at www.fafsa.gov or by calling 1-800-4-FED-AID. If you

cannot obtain the code, write in the complete name, address, city and state of the college. For state aid, you may wish to list your preferred college first.

To find out how to have more colleges receive your FAFSA information, read What is the FAFSA? on page 10.

103. a

103. c

103. e

103. g

1ST FEDERAL SCHOOL CODE

OR

2ND FEDERAL SCHOOL CODE

OR

3RD FEDERAL SCHOOL CODE

OR

4TH FEDERAL SCHOOL CODE

OR

HOUSING PLANS

STATE

NAME OF

COLLEGE

103. b on campus

ADDRESS

AND CITY

STATE

NAME OF

COLLEGE

ADDRESS

AND CITY

103. d

STATE

NAME OF

COLLEGE

ADDRESS

AND CITY

103. f

STATE

NAME OF

COLLEGE

ADDRESS

AND CITY

103. h

1

with parent

2

off campus

3

on campus

1

with parent

2

off campus

3

on campus

1

with parent

2

off campus

3

on campus

1

with parent

2

off campus

3

Step Seven (Student and Parent): Read, sign and date.

If you are the student, by signing this application you certify that you (1) will use federal and/or

state student financial aid only to pay the cost of attending an institution of higher education, (2)

are not in default on a federal student loan or have made satisfactory arrangements to repay it,

(3) do not owe money back on a federal student grant or have made satisfactory arrangements to

repay it, (4) will notify your college if you default on a federal student loan and (5) will not receive a

Federal Pell Grant from more than one college for the same period of time.

104. Date this form was completed

If you are the parent or the student, by signing this application you certify that all of the information

you provided is true and complete to the best of your knowledge and you agree, if asked, to

provide information that will verify the accuracy of your completed form. This information may

include U.S. or state income tax forms that you filed or are required to file. Also, you certify that you

understand that the Secretary of Education has the authority to verify information reported

on this application with the Internal Revenue Service and other federal agencies. If you

sign any document related to the federal student aid programs electronically using a personal

identification number (PIN), you certify that you are the person identified by the PIN and have not

disclosed that PIN to anyone else. If you purposely give false or misleading information, you may

be fined up to $20,000, sent to prison, or both.

105. Student (Sign below)

If you or your family paid a fee for someone to

fill out this form or to advise you on how to fill it

out, that person must complete this part.

106. Preparer’s Social Security Number (or 107)

Preparer’s name, firm and address

107. Employer ID number (or 106)

–

MONTH

2014

or

2015

1

Parent (A parent from Step Four sign below.)

2

COLLEGE USE ONLY

–

–

DAY

D/O

1

FEDERAL SCHOOL CODE

Homeless

Youth

Determination

4

FAA Signature

1

108. Preparer’s signature and date

DATA ENTRY

USE ONLY:

1

For Help — 1-800-433-3243

Page 8

P

\*

L

E

Notes for question 53 (page 5)

Notes for Step Four, questions 59–94 (pages 6 and 7)

Answer “Yes” if at any time since you turned age 13:

3FWJFXBMMinstructionsCFMPXUPEFUFSNJOFXho is considered a parent

t You had no living parent (biological or adoptive), even if you are now

adopted; or

t You were in foster care, even if you are no longer in foster care today;

or

t You were a dependent or ward of the court, even if you are no longer

a dependent or ward of the court today. For federal student aid

purposes, someone who is incarcerated is not considered a ward of

the court.

The financial aid administrator at your school may require you to provide

proof that you were in foster care or a dependent or ward of the court.

Notes for questions 54 and 55 (page 5)

The definition of legal guardianship does not include your parents, even

if they were appointed by a court to be your guardians. You are also not

considered a legal guardian of yourself.

Answer “Yes” if you can provide a copy of a court’s decision that as of

today you are an emancipated minor or are in legal guardianship. Also

answer “Yes” if you can provide a copy of a court’s decision that you were

an emancipated minor or were in legal guardianship immediately before

you reached the age of being an adult in your state. The court must be

located in your state of legal residence at the time the court’s decision

was issued.

Answer “No” if you are still a minor and the court decision is no longer

in effect or the court decision was not in effect at the time you became

an adult.

The financial aid administrator at your college may require you to provide

proof that you were an emancipated minor or in legal guardianship.

Notes for questions 56–58 (page 5)

Answer “Yes” if you received a determination at any time on or after

July 1, 2013, that you were an unaccompanied youth who was homeless

or at risk of being homeless.

t “Homeless” means lacking fixed, regular and adequate housing. You

may be homeless if you are living in shelters, parks, motels or cars, or

are temporarily living with other people because you have nowhere

else to go. Also, if you are living in any of these situations and fleeing

an abusive parent you may be considered homeless even if your

parent would provide support and a place to live.

t “Unaccompanied” means you are not living in the physical custody

of your parent or guardian.

t “Youth” means you are 21 years of age or younger or you are still

enrolled in high school as of the day you sign this application.

Answer “No” if you are not homeless or at risk of being homeless, or do

not have a determination. You should contact your financial aid office

for assistance if you do not have a determination but believe you are an

unaccompanied youth who is homeless or are an unaccompanied youth

providing for your own living expenses who is at risk of being homeless.

The financial aid administrator at your college may require you to

provide a copy of the determination if you answered “Yes” to any of

these questions.

Notes for students unable to provide parental information on

pages 6 and 7

Under very limited circumstances (for example, your parents are

incarcerated; you have left home due to an abusive family environment;

or you do not know where your parents are and are unable to contact

them), you may be able to submit your FAFSA without parental

information. If you are unable to provide parental information, skip

Steps Four and Five, and go to Step Six. Once you submit your FAFSA

without parental data, you must follow up with the financial aid office

at the college you plan to attend, in order to complete your FAFSA.

Page 9

on this form:

t If your parent was never married and does not live with your

other legal parent, or if your parent is widowed or not SFmarried,

answerthequestions about that parent.

t If your legal parents (biological and/or adoptive) are not married to

each other and live together, select “Unmarried and both parents

living together” and provide information about both of them

regardless of their gender. Do not include any person who is not

married to your parent and who is not a legal or biological parent.

Contact 1-800-4-FED-AID for assistance in completing questions

80-94.

t If your parents are married, select “Married or remarried.”

Consistentwith the Supreme Court decision IPMEJOH4FDUJPOPG

the Defense of Marriage Act (DOMA) VODPOTUJUVUJPOBM, same-sex

couples must report their marital status as married if they were

legally married in a state or other jurisdiction (foreign country)

that permits same-sex marriage

XJUIPVU SFHBSE UP XIFSF UIF

DPVQMF SFTJEFT. If your legal parents are divorced but living

together, select “Unmarriedand both parentsliving together.” If

your legal parents are separated but living together, select

“Married or remarried,” not “Divorced or separated.”

t If your parents are divorced or separated, answer the questions about

the parent you lived with more during the past 12 months. (If you did

not live with one parent more than the other, give answers about

the parent who provided more financial support during the past 12

months or during the most recent year that you actually received

support from a parent.) If this parent is remarried as of today, answer

the questions about that parent and your stepparent.

t If your widowed parent is remarried as of today, answer the questions

about that parent and your stepparent.

Notes for questions 84 (page 6)

and 102 (page 8)

In general, a person may be considered a dislocated worker if he or she:

t is receiving unemployment benefits due to being laid off or losing a

job and is unlikely to return to a previous occupation;

t has been laid off or received a lay-off notice from a job;

t was self-employed but is now unemployed due to economic

conditions or natural disaster; or

t is a displaced homemaker. A displaced homemaker is generally a

person who previously provided unpaid services to the family (e.g., a

stay-at-home mom or dad), is no longer supported by the husband or

wife, is unemployed or underemployed, and is having trouble finding

or upgrading employment.

If a person quits work, generally he or she is not considered a dislocated

worker even if, for example, the person is receiving unemployment

benefits.

Answer “Yes” to question 84 if your parent is a dislocated worker. Answer

“Yes” to question 102 if you or your spouse is a dislocated worker.

Answer “No” to question 84 if your parent is not a dislocated worker.

Answer “No” to question 102 if neither you nor your spouse is a dislocated

worker.

Answer “Don’t know” to question 84 if you are not sure whether your

parent is a dislocated worker. Answer “Don’t know” to question 102 if

you are not sure whether you or your spouse is a dislocated worker. You

can contact your financial aid office for assistance in answering these

questions.

The financial aid administrator at your college may require you to

provide proof that your parent is a dislocated worker, if you answered

“Yes” to question 84, or that you or your spouse is a dislocated worker, if

you answered “Yes” to question 102.

What is the FAFSA ?

Information on the Privacy Act and use of your

Social Security Number

Why fill out a FAFSA?

We use the information that you provide on this form to determine if you are

eligible to receive federal student financial aid and the amount that you are

eligible to receive. Sections 483 and 484 of the Higher Education Act of 1965,

as amended, give us the authority to ask you and your parents these questions,

and to collect the Social Security Numbers of you and your parents. We use your

Social Security Number to verify your identity and retrieve your records, and we

may request your Social Security Number again for those purposes.

SM

The Free Application for Federal Student Aid (FAFSA) is the first step in the

financial aid process. You use the FAFSA to apply for federal student aid, such

as grants, loans and work-study. In addition, most states and colleges use

information from the FAFSA to award nonfederal aid.

Why all the questions?

The questions on the FAFSA are required to calculate your Expected Family

Contribution (EFC). The EFC measures your family’s financial strength and is

used to determine your eligibility for federal student aid. Your state and the

colleges you list may also use some of your responses. They will determine if

you may be eligible for school or state aid, in addition to federal aid.

How do I find out what my Expected Family Contribution (EFC) is?

Your EFC will be listed on your Student Aid Report (SAR). Your SAR summarizes

the information you submitted on your FAFSA. It is important to review your SAR

to make sure all of your information is correct and complete. Make corrections

or provide additional information, as necessary.

State and institutional student financial aid programs may also use the

information that you provide on this form to determine if you are eligible to

receive state and institutional aid and the need that you have for such aid.

Therefore, we will disclose the information that you provide on this form to

each institution you list in questions 103a - 103h, state agencies in your state of

legal residence and the state agencies of the states in which the colleges that

you list in questions 103a - 103h are located.

How much aid will I receive?

If you are applying solely for federal aid, you must answer all of the following

questions that apply to you: 1-9, 14-16, 18, 21-23, 26, 28-29, 32-37, 39-59, 61-68,

70, 73-86, 88-102, 104-105. If you do not answer these questions, you will not

receive federal aid.

Using the information on your FAFSA and your EFC, the financial aid office at

your college will determine the amount of aid you will receive. The college will

use your EFC to prepare a financial aid package to help you meet your financial

need. Financial need is the difference between your EFC and your college’s

cost of attendance (which can include living expenses), as determined by

the college. If you or your family have unusual circumstances that should be

taken into account, contact your college’s financial aid office. Some examples

of unusual circumstances are: unusual medical or dental expenses or a large

change in income from last year to this year.

Without your consent, we may disclose information that you provide to entities

under a published “routine use.” Under such a routine use, we may disclose

information to third parties that we have authorized to assist us in administering

the above programs; to other federal agencies under computer matching

programs, such as those with the Internal Revenue Service, Social Security

Administration, Selective Service System, Department of Homeland Security,

Department of Justice and Veterans Affairs; to your parents or spouse; and to

members of Congress if you ask them to help you with student aid questions.

When will I receive the aid?

Any financial aid you are eligible to receive will be paid to you through your

college. Typically, your college will first use the aid to pay tuition, fees and room

and board (if provided by the college). Any remaining aid is paid to you for your

other educational expenses. If you are eligible for a Federal Pell Grant, you may

receive it from only one college for the same period of enrollment.

How can I have more colleges receive my FAFSA information?

If you are completing a paper FAFSA, you can only list four colleges in the

school code step. You may add more colleges by doing one of the following:

1. Use the Federal Student Aid PIN you will receive after your FAFSA has been

processed and go to FAFSA on the Web at www.fafsa.gov. Click the “Login”

button on the home page to log in to FAFSA on the Web, then click “Make

FAFSA Corrections.”

2. Use the Student Aid Report (SAR), which you will receive after your FAFSA is

processed. Your Data Release Number (DRN) verifies your identity and will

be listed on the first page of your SAR. You can call 1-800-4-FED-AID and

provide your DRN to a customer service representative, who will add more

school codes for you.

3. Provide your DRN to the financial aid administrator at the college you want

added, and he or she can add their school code to your FAFSA.

Note: Your FAFSA record can only list up to ten school codes. If there are ten

school codes on your record, any new school codes that you add will replace

one or more of the school codes listed.

Where can I receive more information on student aid?

The best place for information about student financial aid is the financial aid

office at the college you plan to attend. The financial aid administrator can tell

you about student aid available from your state, the college itself and other

sources.

t You can also visit our web site StudentAid.gov.

t For information by phone you can call our Federal Student Aid Information

Center at 1-800-4-FED-AID (1-800-433-3243). TTY users (for the hearing

impaired) may call 1-800-730-8913.

t You can also check with your high school counselor, your state aid agency

or your local library’s reference section.

Information about other nonfederal assistance may be available from foundations,

religious organizations, community organizations and civic groups, as well as

organizations related to your field of interest, such as the American Medical

Association or American Bar Association. Check with your parents’ employers or

unions to see if they award scholarships or have tuition payment plans.

Page 10

If the federal government, the U.S. Department of Education, or an employee

of the U.S. Department of Education is involved in litigation, we may send

information to the Department of Justice, or a court or adjudicative body, if the

disclosure is related to financial aid and certain conditions are met. In addition,

we may send your information to a foreign, federal, state, or local enforcement

agency if the information that you submitted indicates a violation or potential

violation of law, for which that agency has jurisdiction for investigation

or prosecution. Finally, we may send information regarding a claim that is

determined to be valid and overdue to a consumer reporting agency. This

information includes identifiers from the record; the amount, status and history

of the claim; and the program under which the claim arose.

State Certification

By submitting this application, you are giving your state financial aid agency

permission to verify any statement on this form and to obtain income tax

information for all persons required to report income on this form.

The Paperwork Reduction Act of 1995

According to the Paperwork Reduction Act of 1995, no persons are required

to respond to a collection of information unless such collection displays a

valid OMB control number, which for this form is 1845-0001. Public reporting

burden for this collection of information is estimated to average three hours

per response, including time for reviewing instructions, searching existing

data sources, gathering and maintaining the data needed, and completing

and reviewing the collection of information. The obligation to respond to

this collection is voluntary. Send comments regarding the burden estimate

or any other aspect of this collection of information, including suggestions

for reducing this burden, to the Federal Student Aid Information Center, P.O.

Box 84, Washington, D.C. 20044. Please do not return the completed FAFSA to

this address.

We may request additional information from you to process your application

more efficiently. We will collect this additional information only as needed and

on a voluntary basis.